SUSTAINABILITY & SPORTS SCIENCE JOURNAL

Volume 4
Issue 1
January 2026

EDITED & PUBLISHED BY

ARD
ASOCIACIÓN ESPAÑOLA

ASOCIACIÓN ESPAÑOLA DE ANÁLISIS DEL RENDIMIENTO DEPORTIVO

SUSTAINABILITY & SPORTS SCIENCE JOURNAL

ORIGINAL ARTICLE

What distinguishes the successful athletes from elite athletes in terms of their self-competencies? Both groups are similar supported by the elite sports school system, but different in their performance level

Sebastian Schröder . *Otto-von-Guericke University Magdeburg. Magdeburg, Germany.*

ABSTRACT

The special status of the elite schools of sport implies targeted support in order to legitimise the existence of the elite schools of sport. The poor track record of sports schools that support summer sports needs to be explained and optimised. The present study investigates the correlations between self-related competences and their differences in age- and performance-differentiated groups. The results show that the greatest differences between the groups exist between the athletes with regard to the stress and threat categories, with the successful athletes in particular showing lower scores on the threat scale (mean = 0.469, SD = 0.36; p = .038, η^2 = .117) and on the stress-related items (mean = 0.44, SD = 0.37, $p \leq .001$, η^2 = .556). At the same time, the level of certain areas of competence, such as the ability to plan, is higher in the group of top performers (mean = 1.71, p = .071, η^2 = .093). These differences are evident compared to the younger comparison group and also in comparison to athletes of the same age who have the same support systems but different performance levels. On the one hand, the results show that the stress potential increases with increasing time and that stress resistance is most likely already inherent in young athletes.

Keywords: Physical activity, Sports institutions, Sports coaching, Athletic performance, School age, Self-regulation.

Cite this article as:
Schröder, S. (2026). What distinguishes the successful athletes from elite athletes in terms of their self-competencies? Both groups are similar supported by the elite sports school system, but different in their performance level. *Sustainability and Sports Science Journal*, *4*(1), 1-13. https://doi.org/10.55860/XXZS2262

Corresponding author. *Otto-von-Guericke University Magdeburg. Magdeburg, Germany*.
E-mail: sebastian.schroeder@ovgu.de
Submitted for publication May 13, 2025.
Accepted for publication June 26, 2025.
Published October 02, 2025.
Sustainability and Sports Science Journal. ISSN 2990-2975.

Identifier: https://doi.org/10.55860/XXZS2262

INTRODUCTION

This study aims to answer the question of how very good athletes differ from top athletes when the support systems are the same. To this end, 58 athletes were surveyed, 8 of whom are categorised as top athletes because they compete internationally. The study is based on the assumption that self-competence plays a key role in success. The ability to cope well with stress, for example, appears to be extremely important, as a competitive sporting career is subject to significant stress influences that need to be mastered (Haut, Prohl & Emrich, 2013, Emrich & Güllich, 2008). It can therefore be assumed that top athletes have significantly improved stress regulation skills and are more likely to perceive stressful situations as challenging, even though these situations apply equally to all athletes due to the organisational equality of the support systems. But why does the dropout rate increase for some athletes due to perceived stress and for others the stress remains without negative consequences (Pfitzner & Neuber, 2020)? Support systems therefore need to be developed that help as many athletes as possible to develop their skills so that they can manage their own competitive sporting career themselves in order to reduce negative stress. The elite schools of sport must play a major role in this context.

The resolution passed by the Conference of Sports Ministers and the DOSB in 2017 is clear: the further development of elite sports schools must be promoted. This will allow athletes to pursue successful careers without compromising their education. The success of an elite school of sport can ultimately be categorised by the number of medals, although this only allows limited conclusions to be drawn about the quality of the school support systems. One quality criterion in this study is that the top athletes have a squad status that enables them to compete internationally; a top 3 ranking in Germany is a prerequisite for this. The other athletes are also successful and have squad status, which is a prerequisite for being allowed to study at an elite school of sport. The participants in the study therefore have comparable talent potential and ultimately the same funding conditions. But what is the difference? What ultimately leads to top success and what prevents it? Self-regulation skills are compared in this study as one part of the answer to this complex question. The results of previous studies have shown that the existing motive structure influences career progression (Schröder, 2018). As the participants in this study are already part of the upper school and have therefore already had many years of training, it can be assumed that a suitable motivational structure is present and that no major differences are to be expected in this area. The findings should serve to optimise the areas of support and thus positively influence careers.

Theoretical background

The BMI's elite sport reform has set itself the goal of creating 'optimal framework conditions for athletes' (Hottenrott & Braumann, 2015) and promoting dual careers, emphasising the importance of career advisors, for example. When analysing the effectiveness of these measures, the BMI and the DOSB had to admit in 2022 that the increased investments did not bring about a turnaround in competitive sport (Bundesrechnungshof, 2023). For the 2023 budget, the BMI has a total of 300 million euros at its disposal to promote elite sports systems. Every year, an analysis of the potential of PotAS (analysis of the potential of elite sport) is carried out and the possible potential of sporting success is analysed, whereby the 'structures' are also analysed in addition to the success categories "*success*" and 'squad potential' (cf. Bundesrechnungshof, 2023), which also concern the elite schools of sport, for example. The Sports Promotion Act (BMI, 2024) is intended to create an independent body to manage and review the allocation of funds for elite sports promotion.

The present study is intended to examine the part of sports promotion at an elite sports school that deals with the areas of competence that are present in the sports students and may influence a career.

As a result of the findings, measures should be taken to ensure that students receive better support during their dual career in order to counteract a loss of motivation and the associated risk of dropping out (Granz et al., 2019, Schröder & Knisel, 2024). The importance of a dual career, in which an academic career is supported in addition to competitive sport, seems particularly challenging (Lopez-Chamorro & Simon, 2018; European Commission, 2012). The paths of a dual career can be divided into three areas, in which the sports or academic part predominates and in areas in which both are equally distributed (Stambulowa, 2021; Stambulowa & Wyllemann, 2019).

Sports practice at elite schools of sport (EdS) shows that these phases take place alternately and depend on the annual periodisation of the school and sport. It is important to optimally combine both planning phases in order to avoid negative stress. Barth, Emrich & Güllich (2019) point out that the needs for specialised sports training and participation in other sports also change over the course of the development of competitive sports careers. The results, as well as this approach, illustrate the possible influence of individualised support for athletes in order to provide optimal support.

The support systems in elite sport are hierarchically structured and sometimes confusing, meaning that capacities cannot be optimally utilised and therefore remain unused by the athletes. In this context, Borggrefe, Cachay and Werner (2024) point out that the high investment made by students at an Eds can only be legitimised by optimising a dual career between school and sport (Hummel, 2024). The measures to promote a dual career have resulted, among other things, in a sharp increase in financial support for elite sport, although the number of countable successes has tended to decrease (Hottenroth & Braumann, 2015). Emrich, Fröhlich, Klein & Pitsch (2009) have already shown that, unfortunately, there were no differences in performance in terms of sporting success between sports school students and non-sports school students at the Summer Olympics, which raises the question of the effectiveness of an elite sports school.

The reason for the lack of effectiveness may be problems that arise in reconciling the different demands of school and sport. Borggrefe, Cachay and Werner (2024, p. 45) speak of an inclusion problem in this context because the athletes are supposed to function as part of two different systems. Athletes therefore have a high degree of personal responsibility to integrate all demands, including their own, profitably into their everyday lives.

This requires very well-developed self-control skills, which the athletes must have in order to, for example, bring stress resistance and increase self-efficacy (Dirmanchi & Khanjani, 2019). Self-efficacy can only be demonstrated if athletes have the necessary skills to recognise and use resources. Support systems play a major role here, with coaches in particular playing a crucial role (Schröder, 2025; Sari & Bayazit, 2017). Time must be used optimally to create free spaces that also offer opportunities for recovery. In the context of dropout research in competitive sport, analysing the resources of older athletes is very important (cf. Schröder, 2018, Stambulova & Harwood, 2022). Therefore, the urge to justify competitive sport must generally be positive in order not to question the enormous effort involved. The question on which this study is based is therefore concerned with the different manifestations of relevant competences, comparing talented athletes with top athletes who had the same support systems and were also supported at the same elite sports school. The different results may indicate which needs are particularly high in terms of self-management skills in order to optimise career development. At the same time, the results could indicate that the competences are generally strong and that athletes need special support whose self-regulation competences are not strong enough in some areas, as a complex talent dimension naturally requires many areas in order to ultimately emerge as one of the most successful athletes. In the context of the psychological prerequisites analysed here, the relevant criteria for sporting talent include mental resilience, stress stability,

performance motivation, competitive anxiety and resilience (Hohmann, 2009; Seidel, 2011; Pfitzner & Neuber, 2020).

In their holistic model of athlete development, Thompson, Rongen, Cowburn and Till (2022) point out the influences of the sports school system and, among other things, address a lack of time, high pressure, including at school level, and an increased number of absences among the jeopardising aspects. These aspects imply further consequences that prevent a positive balance of investment in competitive sport, which in turn increases the risk of dropout. There is therefore a risk of losing social integration because, for example, no autonomy is possible in terms of time planning, which ultimately significantly reduces the degree of self-determination (Deci & Ryan, 2001).

The sports careers described above are subject to strong fluctuations. The ability to defy these and anticipate disruptive factors appears to be a key qualification. As stress can be understood as a processual and reciprocal person-environment transaction (Oertel, 2010), the support provided to female athletes must be of particular importance.

The balancing act between competitive sport and the demands of school leads to an increased perception of stress (Güllich & Richartz, 2015), which must be taken into account, as otherwise there is a risk of dropout or even depression (Weimann, 2014). A support network consisting of elite schools of sport and sports associations should serve as a basis for meeting the academic and sporting demands outlined above without losing sight of the athletes' needs (Wendeborn, Drewicke & Hummel, 2018). The DOSB emphasises the importance of elite schools of sport in optimally promoting both careers (DOSB, 2013, p. 18). In addition to school and sport-specific support programmes (Borchert, 2013; Stiller, 2023), the mental health of athletes must also be considered (Breithecker, 2018).

METHODS

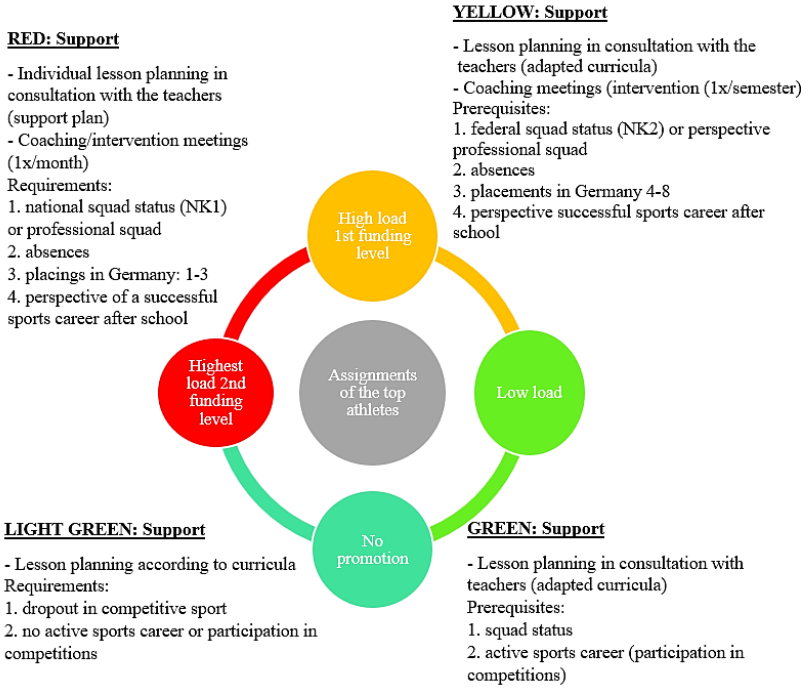


Figure 1. Athlete status as a f unction of athletic performance.

58 students aged from 10 to 18 years (mean age = 15.33, SD = 3.39) participated in the study. The students were recruited from the elite sport-school in Berlin and finally devited into three groups. 35 participants are part of the sportschool-system for a couple of years and now attending the final class (mean age 17.74, SD = 0.85). The other group (N = 15, mean age = 10.67, SD = 0.72) consists of students who are in the 7th grade of the elite sports school. The results of the 7-graders students are compared with the results of the older students as part of a cross-sectional study in order to be able to draw conclusions here as well. 8 athletes at the highest top level were also interviewed in order to identify differences between the top performers and those athletes who are equally supported in the sports school system but do not achieve top performances. The athletes were categorised using traffic light coding (see Fig. 1). This resulted in three groups (Table 1), which were compared with each other using ANOVA. A correlation analysis of the respective categories should provide information about the dependencies within the constructs. The SSI-K3 (Kuhl & Fuhrmann, 2004) is the most reliable tool for assessing self-control competencies for the present study. Its validity is consistently proven (α > 0.73 - 0.9) and has been validated for this study (α > 0.78) as well.

RESULTS

The logic of the results section presupposes that the validity of the questionnaire is shown first and that an item validity test must be carried out if Chronbach's alpha is unsatisfactory. Using a correlation crossover table, possible correlations between variables are first shown in order to then compare the variables that show significant differences between the groups with those that show a high correlation (Table 2). From this, dependencies are to be recognised, which can explain the group differences.

The three groups are tested for differences using an ANOVA to show whether the different age groups also show significant differences in mean values under similar conditions. These results are intended to show whether there may be a need for support because certain crucial skills are reduced in those who are talented but are ultimately no longer among the top performers.

Finally, group differences are measured among 12-graders of the same age who differ in terms of performance. For the sake of clarity, the two groups are only analysed with regard to the variables that already showed major differences in the descriptive statistics.

Table 1. Sample size and demographic characteristics.

Groups	Athletes 7 graders	Athletes 12 graders	12 graders top performer	Total
N	15	35	8	58
Mean age	11.47	17.4	17.2	15.54
SD	0.64	0.99	1.14	2.45

Table 2. Descriptive statistics, standard deviations, alpha reliability and correlations for main variables in the study.

Skala	N	M	SD	∝	1	2	3	4	5	6	7	8	9
Ability to plan	57	1.39	0.68	0.62	1								
Realise in-tentions	57	1.57	0.69	0.70	-.167	1							
Initiative	57	1.69	0.59	0.50	.100	.616**	1						
Self-access	57	1.88	0.61	0.87	.053	.552**	.330*	1					
Coping with failure	57	1.70	0.64	0.64	.058	.605**	.447**	.750**	1				
Self-aware-ness	57	1.86	0.76	0.76	-.002	.314*	.158	.904**	.541**	1			
Integration	57	2.08	0.76	0.83	.077	.493*	.248	.857**	.405**	.712**	1		
Stress	57	1.66	0.98	0.91	-.302*	-.014	-.045	.186	.171	.192	.104	1	
Threat	56	1.06	0.79	0.82	.179	-.308*	-.393**	-.332*	-.352**	-.191	-.313*	.106	1

*Note. **. Correlation is significant at the .01 level (2-tailed), *. Correlation is significant at the .05 level (2-tailed).*

It can be seen that the validity of the questionnaire categories is mostly given. The poorer results for the categories 'initiative' (.59), self-access (.61) and coping with failure (.64) can be explained by the fact that there is a large variance in the survey group and the group differences are quite large here. The validity with regard to the individual groups proved to be satisfactory, so that these categories are also taken into account in the interpretation of the results.

Table 3. Mean Value, SD of the groups related to the main variables.

Variable / Group	Realise intentions		Self-Access		Coping with failure		Self-awareness		Integration	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
7 graders	1.72	0.83	1.94	0.46	1.77	0.63	1.93	0.35	2.12	0.74
Athletes 12 graders	1.53	0.55	1.88	0.58	1.70	0.62	1.85	0.78	2.09	0.69
12 graders Top performer	1.50	1.0	1.75	0.96	1.59	0.81	1.71	1.18	1.94	1.1
Total	1.57	0.69	1.88	0.61	1.7	0.64	1.86	0.76	2.08	0.76

Variable / Group	Ability to plan		Initiative		Stress		Threat	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
7 graders	1.58	0.79	1.87	0.56	1.0	0.78	1.35	0.99
Athletes 12 graders	1.22	0.57	1.57	0.62	2.25	0.66	1.07	0.71
12 graders Top performer	1.71	0.72	1.87	0.47	0.44	0.37	0.469	0.36
Total	1.39	0.68	1.69	0.59	1.66	0.98	1.06	0.79

The differences in mean values shown in Table 3 are tested for significance using an ANOVA (Table 4).

Table 4. ANOVA tests showing group differences.

Categories	Source	Sum of Squares	Df	Mean Square	F	Sig.	η^2
Stress	Within groups	30.13	2	15.06	33.84	<.001	0.556
	Between groups	24.04	54	0.45			
Threat	Within groups	4.06	2	2.03	3.495	.038	0.117
	Between groups	30.79	53	0.58			
Coping with failure	Within groups	0.156	2	0.078	0.185	.832	0.007
	Between groups	22.872	54	0.424			
Ability to plan	Within groups	2.400	2	1.20	2.774	.071	0.093
	Between groups	23.36	54				
Self-Access	Within groups	0.187	2	0.094	0.247	.782	0.009
	Between groups	20.43	54	0.378			
Realise intentions	Within groups	0.47	2	0.208	0.421	.658	0.015
	Between groups	26.7	54	0.495			
Self-awareness	Within groups	0.241	2	0.120	0.205	.816	0.008
	Between groups	31.753	54	0.588			
Initiative	Within groups	1.163	2	0.582	1.66	.199	0.058
	Between groups	18.89	54	0.350			
Integration	Within groups	0.194	2	0.097	0.163	.850	0.006
	Between groups	31.99	54	0.592			

*Note. * $p \leq .05$ two-tailed*

Table 5 shows the differences between the two groups of 7th graders and 12th graders. Table 6 shows the selected differences between the groups of Top performers and athletes at the same training level in relation to the selected categories. The variables that showed significance in the pre-tests and whose correlations were comprehensible were taken into account.

Table 5. Differences between 7 and 12-graders athletes, standard deviation, Mann-Whitney U-test, *p* and Cohen`s r.

Categories	Group	n	Mean	SD	Mean rank	Mann-Whitney U-test			Cohen`s r
						U	Z	*p*	
Stress	Athletes 7 graders	15	1.66	0.98	17.03	135.5	-3.27	.001	-0.43
	Athletes 12 graders	43			33.27				
Threat	Athletes 7 graders	15	1.06	0.79	33.03	239.5	-1.27	.206	-0.17
	Athletes 12 graders	43			26.84				
Self-Access	Athletes 7 graders	15	1.88	0.61	29.77	303.5	-0.201	.84	-0.03
	Athletes 12 graders	43			28.73				
Self-awareness	Athletes 7 graders	15	1.86	0.76	30.40	294.0	-0.385	.70	-0.05
	Athletes 12 graders	43			28.50				
Coping with failure	Athletes 7 graders	15	1.70	0.64	29.73	304.0	-0.201	.84	-0.03
	Athletes 12 graders	43			28.74				
Ability to plan	Athletes 7 graders	15	1.39	0.68	33.47	248.0	-1.22	.22	-0.16
	Athletes 12 graders	43			27.40				
Initiative	Athletes 7 graders	15	1.69	0.59	33.23	251.5	-1.17	.243	-0.15
	Athletes 12 graders	43			27.49				
Integration	Athletes 7 graders	15	2.08	0.76	29.50	307.5	-0.137	.891	-0.02
	Athletes 12 graders	43			28.82				
Realise intentions	Athletes 7 graders	15	1.57	0.69	30.03	299.5	-0.284	.77	-0.04
	Athletes 12 graders	43			28.63				

*Note. * p ≤ .05 two-tailed, r = Cohen`s r.*

Table 6. Differences between good athletes and Topperformer of the 12th grade.

Variable	Group	n	Mean	SD	Mean rank	Mann-Whitney U-test			Cohen`s r
						U	Z	*p*	
Stress	Athletes 12 graders	34	1.9	0.94	25.25	8.50	-4.13	<.001	-0.64
	12 graders Top performer	8			5.56				
Threat	Athletes 12 graders	34	.95	0.69	23.06	64.0	-2.25	.024	-0.35
	12 graders Top performer	8			12.50				
Self-Access	Athletes 12 graders	34	1.86	0.66	21.63	131.5	-0.144	.885	-0.02
	12 graders Top performer	8			20.94				
Self-awareness	Athletes 12 graders	34	1.83	0.86	21.66	130.5	-0.178	.863	0.03
	12 graders Top performer	8			20.81				
Coping with failure	Athletes 12 graders	34	1.68	0.65	22.03	118.0	-0.581	.561	-0.09
	12 graders Top performer	8			19.25				
Ability to plan	Athletes 12 graders	34	1.32	0.63	19.88	81.0	-1.78	.081	-0.27
	12 graders Top performer	8			28.38				
Initiative	Athletes 12 graders	34	1.63	0.61	20.34	96.5	-1.28	.210	-0.2
	12 graders Top performer	8			26.44				
Integration	Athletes 12 graders	34	2.07	0.77	21.43	133.5	-0.081	.937	-0.01
	12 graders Top performer	8			21.81				
Realise intentions	Athletes 12 graders	34	1.52	0.64	21.13	123.5	-0.41	.694	-0.06
	12 graders Top performer	8			23.06				

*Note. * p ≤ .05 two-tailed, r = Cohen`s r.*

DISCUSSION

The results of the ANOVA show differences for the categories stress and threat between the three groups of 7th-grade athletes, 12th-grade athletes and 12th-grade top athletes, whereby significant differences (p = .038; η^2 = .117) could be determined for the perceived threat and even highly significant differences ($p \leq$

.001; η^2 = .556) for the perceived stress. An analysis of the correlations between the categories of stress and threat reveals potential in the support systems.

Due to a correlation between a situation perceived as stressful and the ability to plan (r = -.302, *p* = .05), it becomes clear that good support may be able to provide follow-up, guidance and preparation for impassable situations.

For example, the Top performers tended to give a lower rating for the item 'My current life circumstances are already quite tough', whereas the item 'Before I start a big job, I decide how to proceed', for example, had a high rating.

There are also highly significant correlations between perceived threat and initiative (r = -.393, $p \leq .01$) and coping with failure (r = -.352, $p \leq .01$). A high level of initiative competence means, for example, that the item 'When something has to be done, I prefer to start immediately' receives a high score and correlates negatively with, for example, '*A lot has changed in my life that I have to deal with'*. An item for coping with failure is, for example, *'If I can't do a sporting task straight away, I get anxious'*. If this item is particularly high, the probability of lower initiative competence and therefore poorer athlete performance also increases.

It seems that stress related factors differs good athletes from the Top performers, because the Top performers indicate significantly lower values for Stress and Threat (see Fig. 2) and at the same time demonstrate certain competences more strongly. As a brief summary and regarding the correlation-effects there should be a focus on the variables self-access, coping with failure, initiative, and realise intentions. Although there is no difference between the groups regarding these four variables, the correlation between these and the stress-related variables is high (r ≥ 0.3) and partly high significant (p ≤ .001).

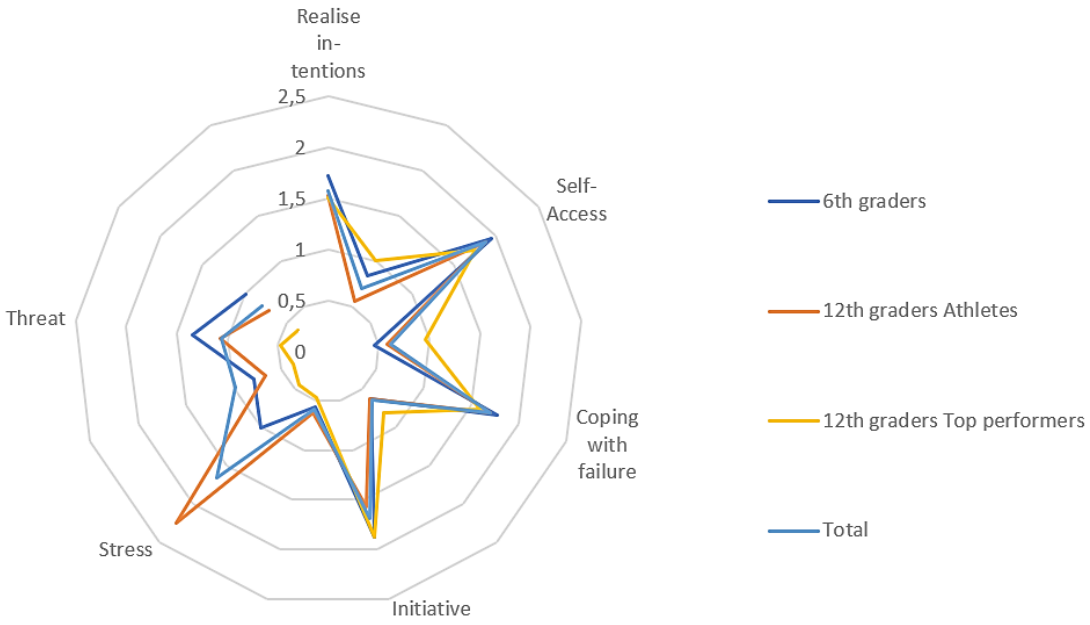


Figure 2. Main important results in relation to the stress-related influencing factors.

The aim of the research was, among other things, to determine psychological factors that favour or jeopardise a sporting career.

The investigation of perceived stress with regard to the same age groups, differentiated into top athletes and good athletes, showed large differences with a large effect size ($p \leq .001$, r = 0.64). The variable threat also showed a significant result ($p = .024$, r = 0.35). The planning ability shows large differences, which are not significant ($p = .081$), but the effect also seems significant due to the high differences in rank (r = 0.27). It also seems understandable that a lack of competence in planning skills can lead to a build-up of anxiety, which results in situations being perceived as threatening and stressful and no longer as positively challenging. This seems to be the biggest difference between the Top performers and the good athletes.

In a subsequent question, it must be clarified to what extent these competences are present or can be promoted through support at an elite school of sport.

The fact that the perceived stress in the comparison of the 7th-grade athletes differs significantly from the results of the older pupils ($p = .001$; r = .43) indicates that this is a talent factor that is already present. On the other hand, the fact that the perception of a threatening situation does not differ between athletes of different ages ($p = .206$; r = 0.17) could indicate that different experiences in the course of a sporting career lead to situations being viewed more as threatening and less as challenging. However, it is only logical that very young athletes have had little experience with threatening situations, so that there are few strong results in this category.

CONCLUSION

The results suggest that close-knit support is required in order to provide athletes with optimal long-term care. The importance of highly individualised support must be emphasised here (Hottenroth & Braumann, 2015; Lohaus & Vierhaus, 2014). The significant differences in self-regulation skills indicate that the resources available for recovery in the context of competitive sports training are not yet sufficiently known. A high level of self-regulation skills is an indication of increased performance in competitive sport (Mc Cardle et al., 2019, Wilson et al., 2021, Young et al., 2023). One conclusion, for example, is to develop a concept that enables athletes to optimally reconcile the stresses of school with those of sport, so that, for example, unnecessary time pressures can be avoided in order to optimise resources (Breithecker, 2018). In addition, regular meetings with sports psychologists should help to precisely formulate joint goals so that both sporting and school goals are not in conflict with each other. One example of increased support for dual careers at an elite school of sport is the additive Abitur. The additive Abitur enables competitive athletes to extend the upper secondary school level to four or five years and also to spread the individual Abitur examinations over several school years. This extends the functionalisation of school for elite athletes beyond the previously known level. Results show that pupils who take advantage of this particular extension achieve better, but not significantly different results. (Sallen et al., 2018). In the context of elite schools of sport, an extension of school time to 13 years must be taken into account in the planning. Within the scope of the time resources available, target discussions should serve to optimise processes for all those involved in promoting dual careers. Whitmore's GROW model (2010), for example, could be suitable for this, as it has a clear structure that quickly shows the athlete alternative courses of action. The goal is clearly defined (G), the goal formulation is compared with reality (R) and options are derived (O), which ultimately cause the will to act (W). The application of this GROW model is to be evaluated in further studies and elaborated as part of an intervention study at elite sports schools. The results of the 7th graders will also be examined continuously and individually as part of a longitudinal study in order to identify whether the skills are talent-dimensioned and whether these skills change over time and therefore need to be influenced more strongly by coaching measures in order to guarantee the athletes' sporting success and the efficiency of the elite schools of sport.

SUPPORTING AGENCIES

No funding agencies were reported by the author.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author.

REFERENCES

Barth, M., Emrich, E., & Güllich, A. (2019). A machine learning approach to "revisit" specialization and sampling in institutionalized practice. Sage Open, 9(2), 2158244019840554. https://doi.org/10.1177/2158244019840554

BISp (2019). Jahrbuch Forschungsförderung 2018/19. ISBN 978-3-96523-024-8. Online-Publikation des Bundesinstituts für Sportwissenschaft. Retrieved form [Accessed 2025, 19 August]: https://www.bisp.de/SharedDocs/Downloads/Publikationen/Jahrbuch/Jahrbuch_2018_2019_Gesamt.pdf?__blob=publicationFile&v=2

BMI (2024). Gesetz zur Regelung der Förderung des Spitzensports und weiterer Maßnahmen gesamtstaatlicher Bedeutung im Sport sowie zur Errichtung der Spitzensport-Agentur. Retrieved form [Accessed 2025, 19 August]: https://www.bmi.bund.de/SharedDocs/gesetzgebungsverfahren/DE/Downloads/kabinettsfassung/SP1/SpoFoeG.pdf?__blob=publicationFile&v=1

Borchert, T., Wartenberg, J., Hummel, A., & Brand, R. Die Erfüllung des übergreifenden ‚Dreifachauftrags 'an den Eliteschulen des Sports in Brandenburg-Theoretische Konzeptionen und empirische Befunde. Die Sportmedizinische Versorgung im Schule Leistungssport Verbundsystem Brandenburg: Gesundheits- und Ernährungsstatus 85!, 25.

Borchert, T. (2013). Ohne doppelten Boden, aber mit Netz? Förderung sportlicher Begabung und soziale Unterstützung an Eliteschulen des Sports in Brandenburg (Dissertation). Chemnitz: Universitätsverlag.

Borggrefe, C., Cachay, K., & Werner, K. (2024). Erfolgreiche Spitzensportförderung? Theoretische Reflexionen zur Steuerung des Spitzensports in Deutschland. Sport und Gesellschaft, 21(1), 25-57. https://doi.org/10.1515/sug-2024-2001

Breithecker, J. (2018). Die NRW-Sportschule: Chronischer Stress und Selbstkonzeptentwicklung von Sportprofilklassen. Meyer & Meyer. https://doi.org/10.5771/9783840312885

Bundesinstitut für Sportwissenschaft (2019). PotAs. Retrieved form [Accessed 2025, 19 August]: https://www.potas.de/

Bundesechnungshof 2023. Bericht nach § 88 Absatz 2 BHO an das Bundesministerium des Innern und für Heimat. Ausgewählte Aspekte der Reform der Spitzensportförderung. Potenzialorientierte Verbändeförderung. Retrieved form [Accessed 2025, 19 August]: https://www.bundesrechnungshof.de/SharedDocs/Downloads/DE/Berichte/2023/spitzensportfoerderung-volltext.pdf?__blob=publicationFile&v=2

Bundesechnungshof 2024. Bericht nach § 88 Absatz 2 BHO an das Bundesministerium des Innern und für Heimat. Ausgewählte Aspekte der Reform der Spitzensportförderung. Förderung der Olympiastützpunkte (Betrieb und Betreuung). Retrieved form [Accessed 2025, 19 August]: https://www.bundesrechnungshof.de/SharedDocs/Downloads/DE/Berichte/2024/olympiastuetzpunkte-volltext.pdf?__blob=publicationFile&v=3

Cachay, K., & Borggrefe, C. (2012). "Dual Careers": The Structural Coupling of Elite Sport and School Exemplified by the German Verbundsysteme. European Journal for Sport and Society, 9(1 + 2), 57-80. https://doi.org/10.1080/16138171.2012.11687889

Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. Handbook of theories of social psychology, 1(20), 416-436. https://doi.org/10.4135/9781446249215.n21

Deutschlandfunk (2018). Potenzialanalyse im Spitzensport "Wo bleibt eigentlich der Athlet in diesem System?". Retrieved form [Accessed 2025, 19 August]: https://www.deutschlandfunk.de/potenzialanalyse-im-spitzensport-wo-bleibt-eigentlich-der.890.de.html?dram:article_id=411342

Dirmanchi, N., & Khanjani, M. S. (2019). Comparison of resilience and self-efficacy in athletes and non-athletes with disabilities caused by spinal cord injury. Iranian Journal of Psychiatry and Clinical Psychology, 25(2), 150-163. https://doi.org/10.32598/ijpcp.25.2.150

DOSB (Deutscher Olympischer Sportbund). (Hrsg.). (2013). Nachwuchsleistungssportkonzept 2020. Retrieved form [Accessed 2025, 19 August]: https://www.dosb.de/themen/leistungssport/nachwuchsleistungssport

DOSB (2015). Der Leistungssport macht sich fit für die Zukunft. Bericht zur Bundestrainer-Konferenz vom 28. bis 30. September 2015 in Hannover. Retrieved form [Accessed 2025, 19 August]: https://www.teamdeutschland.de/news/details/der-leistungssport-macht-sich-fit-fuer-die-zukunft

DOSB, DSLV & dvs (2009). Memorandum zum Schulsport. Retrieved form [Accessed 2025, 19 August]: http://www.sportwissenschaft.de/fileadmin/pdf/download/Memorandum_Schulsport_Druck.pdf

DOSB (2016). Neustrukturierung des Leistungssports und der Spitzensportförderung. Gemeinsames Konzept des Bundesministeriums des Innern und des Deutschen Olympischen Sportbundes unter Mitwirkung der Sportministerkonferenz. Retrieved form [Accessed 2025, 19 August]: https://www.bmi.bund.de/SharedDocs/downloads/DE/publikationen/themen/sport/sport-spitzensport-neustrukturierung.html

DOSB (2017). Konzept für Leistungssportreform Deutschland liegt vor. Retrieved form [Accessed 2025, 19 August]: https://www.dosb.de/aktuelles/news/detail/konzept-fuer-leistungssportreform-deutschland-liegt-vor

Deutscher Bundestag. 8. Sitzung des Sportausschusses. Tagesordnungspunkt 1. Nachberichte des Deutschen Olympischen Sportbundes, des Deutschen Behindertensportverbandes und von Athleten Deutschland zu Tokio 2021 und Peking 2022., § Sportausschuss des Deutschen Bundestages (2022). Retrieved form [Accessed 2025, 19 August]: https://www.bundestag.de/resource/blob/1003042/7b429e4b17d077bb27d2b77f3a3ee18c/220406-Protokoll_8.pdf

Deutscher Olympischer Sportbund (DOSB), und Bundesministerium des Innern (BMI). "Neu- strukturierung des Leistungssports und der Spitzensportförderung. Gemeinsames Kon- zept des Bundesministeriums des Innern und des Deutschen Olympischen Sportbundes unter Mitwirkung der Sportministerkonferenz". Deutscher Olympischer Sportbund (DOSB), 2016.

Emrich, E., Fröhlich, M., Klein, M., & Pitsch, W. (2009). Evaluation of the elite schools of sport: empirical findings from an individual and collective point of view. International Review for the Sociology of Sport, 44(2-3), 151-171. https://doi.org/10.1177/1012690209104797

Güllich, A., & Emrich, E. (2006). Evaluation of the support of young athletes in the elite sports system. European Journal for Sport and Society, 3(2), 85-108. https://doi.org/10.1080/16138171.2006.11687783

Granz, H. L., Schnell, A., Mayer, J., & Thiel, A. (2019). Risk profiles for athlete burnout in adolescent elite athletes: A classification analysis. Psychology of Sport and Exercise, 41, 130-141. https://doi.org/10.1016/j.psychsport.2018.11.005

Ffion Thompson, Fieke Rongen, Ian Cowburn, & Kevin Till (2022). The Impacts of Sports Schools on Holistic Athlete Development: A Mixed Methods Systematic Review 52:1879-1917. https://doi.org/10.1007/s40279-022-01664-5

Fischer, C., Fischer-Ontrup, C., Käpnick, F., Neuber, N., Solzbacher, C., & Zwitserlood, P. (2020). Begabungsförderung, Leistungsentwicklung, Bildungsgerechtigkeit-für alle: Beiträge aus der Begabungsforschung (Vol. 9). Münster. https://doi.org/10.31244/9783830990673

New York: Waxmann, 2020, S. 155-173. https://doi.org/10.31244/9783830990673

Gerloff, I. & Sallen, J. (2021). "Das Abitur und Olympische Medaillen im Visier" - Förderung leistungssportlicher Begabung an der Friedrich-Ludwig-Jahn Sportschule Potsdam. SchulVerwaltung spezial - Zeitschrift für Schulgestaltung und Schulentwicklung, 23(4), S. 181-184.

Güllich, A., & Emrich, E. (2012). Individualistic and collectivistic approach in athlete support programmes in the German high-performance sport system. European Journal for Sport and Society, 9(4), 243-268. https://doi.org/10.1080/16138171.2012.11687900

Güllich, A., & Richartz, A. (2015). Leistungssport. Dritter Deutscher Kinder - und Jugendsportbericht, 140-161.

Haut, J., Prohl, R., & Emrich, E. (2013, May). Nothing but Medals? On the Significance of the Olympic Medal Index in Public Awareness. In Sociology and Sport in the Face of New Challenges.: Abstracts, 10th Conference of the European Association for the Sociology of Sports (p. 111).

Hottenrott, K., & Braumann, K. M. (2015). Current situation in German elite sport: A necessary discussion. Sportwissenschaft, 45, 111-115. https://doi.org/10.1007/s12662-015-0372-1

Hummel, J. W. (2024). Temporally Precise Relationships Between Sleep, Performance and Injury Risk in Collegiate Football Athletes (Doctoral dissertation, Rutgers The State University of New Jersey, School of Graduate Studies).

Kramer, J., Neumann, M., & Trautwein, U. (Eds.). (2016). Abitur und Matura im Wandel: historische Entwicklungslinien, aktuelle Reformen und ihre Effekte (Vol. 2). Springer-Verlag. https://doi.org/10.1007/978-3-658-11693-4

Kuhl, J., & Fuhrmann, A. (2004). Selbststeuerungs-Inventar: SSI-K3 (Kurzversion). Universität Osnabrück: Unveröffentlichtes Manuskript.

Niehues, M. (2023). Motivation and Performances of Student-Athletes in Dual Careers. Universität Hamburg (Germany).

Niehues, M., Gerlach, E., & Sallen, J. (2021). Measuring dual career motivation among German student-athletes using the Student Athletes' Motivation Toward Sports and Academics Questionnaire. Challenges and failures of linguistic and cultural adaptations. German Journal of Exercise and Sport Research. Advance online publication. https://doi.org/10.1007/s12662-021-00723-9

Pfitzner, M. (2020). Talente im Sport: Neue Perspektiven zur leistungssportlichen Förderung junger Athletinnen und Athleten.

Radtke, S., & Freier, M. P. (2022). Analyse des Stützpunktsystems zur Förderung des paralympischen Spitzen- und Nachwuchsleistungs-sports in Deutschland. BISp-Jahrbuch, 79.

Sallen, J. (2018). Das "Additive Abitur" auf dem Prüfstand. Perspektiven von leistungssportlich aktiven Jugendlichen auf einen Schulversuch zur Förderung dualer Karrieren. Sportunterricht, 67 (10), 451-456.

Sallen, J., Borchert, T., & Gerlach, E. (2018). Die Schulzeitstreckung in der gymnasialen Oberstufe: Ein Wundermittel zur Entlastung von Schülerathlet/innen an Eliteschulen des Sports? In E. Balz & D. Kuhlmann (Hrsg.), Sportwissenschaft in pädagogischem Interesse. 30. Jahrestagung der dvs-Sektion Sportpädagogik vom 15.- 17. Juni 2017 in Hannover (S. 178-180). Hamburg: Czwalina.

Sallen, J., Zetzsche, R., Wendeborn, T., & Gerlach, E. (2018). Evaluation von Angeboten zur Förderung Dualer Karrieren an Schule-Leistungssport-Verbundsystemen unter besonderer Berücksichtigung des Modellversuchs Additives Abitur: Halbzeitzeitstand. BISp-Jahrbuch Forschungsförderung, 19, 115-121.

Sari, İ., & Bayazit, B. (2017). The relationship between perceived coaching behaviours, motivation and selfefficacy in wrestlers. Journal of Human Kinetics, 57(1), 239-251. https://doi.org/10.1515/hukin-2017-0065

Schröder, S. (2018). Zur Erfassung der Entwicklung expliziter und impliziter Motivstrukturen unter besonderer Berücksichtigung des Leistungs- und Anschlussmotivs im Sport (Doctoral dissertation, Dissertation, Magdeburg, Universität, 2018).

Schröder, S. (2025). The role of positive and negative reinforcement by coaches in the acquisition of new motor skills depending on the present sport motive. Scientific Journal of Sport and Performance, 4(2), 147-161. https://doi.org/10.55860/TRIR2937

Schröder, S., & Knisel, E. (2024). The impact of sport-specific achievement and affiliation motives on young athletes' dropout and persistence in elite sports. Scientific Journal of Sport and Performance, 3(4), 471-484. https://doi.org/10.55860/GLQC1549

Stambulova, N., & Harwood, C. (2022). A dual career: combining sport and studies. Front. Young Minds, 10, 692422. https://doi.org/10.3389/frym.2022.692422

Stambulova, N. B., & Wylleman, P. (2019). Psychology of athletes' dual careers: A state-of-the-art critical review of the European discourse. Psychology of Sport and Exercise, 42, 74-88. https://doi.org/10.1016/j.psychsport.2018.11.013

Stiller, T. (2023). Shut up and dribble "-zur Legende des "mündigen Athleten. German Journal of Exercise and Sport Research, 53(1), 123-128. https://doi.org/10.1007/s12662-022-00805-2

Thompson, F., Rongen, F., Cowburn, I., & Till, K. (2022). The Impacts of Sports Schools on Holistic Athlete Developm.

Thompson, F., Rongen, F., Cowburn, I., & Till, K. (2023). What is it like to be a sport school student-athlete? A mixed method evaluation of holistic impacts and experiences. Plos one, 18(11), e0289265. https://doi.org/10.1371/journal.pone.0289265

Veber, M., Benölken, R., & Pfitzner, M. (Eds.). (2019). Potenzialorientierte Förderung in den Fachdidaktiken. Waxmann Verlag.

Vidal-Vilaplana, A., Valantine, I., Staskeviciute-Butiene, I., González-Serrano, M. H., Capranica, L., & Calabuig, F. (2022). Combining sport and academic career: Exploring the current state of student-athletes' dual career research field. Journal of Hospitality, Leisure, Sport & Tourism Education, 31, 100399. https://doi.org/10.1016/j.jhlste.2022.100399

Wendeborn, T. (2023). Das Prinzip Leistung in Dualen Karrieren. In Leistung aus sportpädagogischer Perspektive (pp. 355-375). Wiesbaden: Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-41233-3_15

Wendeborn, T., Drewicke, E., & Hummel, A. (2018). Verbundsysteme Schule-Leistungssport in der Bundesrepublik Deutschland. Ein Überblick. Sportunterricht, 67(10), 435-439.

Whitmore, J. (2010). Coaching for Performance: The Principles and Practice of Coaching and Leadership fully revised 25th anniversary edition. Hachette UK.

Wilson, S. G., Young, B. W., Hoar, S., & Baker, J. (2021). Further evidence for the validity of a survey for self-regulated learning in sport practice. Psychology of Sport and Exercise, 56, 101975. https://doi.org/10.1016/j.psychsport.2021.101975

Young, B. W., Wilson, S. G., Hoar, S., Bain, L., Siekańska, M., & Baker, J. (2023). On the self-regulation of sport practice: Moving the narrative from theory and assessment toward practice. Frontiers in Psychology, 14, 1089110. https://doi.org/10.3389/fpsyg.2023.1089110

SUSTAINABILITY & SPORTS SCIENCE JOURNAL

REVIEW ARTICLE

A fundamental research on issues of baseball-type physical education classes in Japan: Through a review of practice-based research

Kentaro Fukuda . *High School Fukuyama. Hiroshima University. Japan.*

ABSTRACT

The purpose of this study was to identify the challenges associated with baseball-type activities in physical education classes through a review of research on instructional practices. To this end, 26 previous studies were selected for analysis, and descriptions related to instructional challenges were extracted. A category analysis was then conducted on the extracted descriptions. The procedure for the category analysis was as follows. First, the extracted descriptions were coded based on their content. Next, focusing on the similarities among the codes, subcategories were generated to encompass multiple related codes. In a similar manner, higher-order categories were created to group the subcategories. Following this, the proportions of each category were calculated, and the challenges of baseball-type instruction in physical education were examined accordingly. As a result, the challenges that emerge in the implementation of baseball-type lessons in physical education were found to fall into five categories: [Skill Development], [Deepening of Learning], [Lesson Design], [Learner Support], and [Improvement of Teaching Methods].

Keywords: Lesson improvement, Ball sports, Softball, Health, Physical education, Sport activities.

Cite this article as:
Fukuda, K. (2026). A fundamental research on issues of baseball-type physical education classes in Japan: Through a review of practice-based research. *Sustainability and Sports Science Journal*, *4*(1), 14-24. https://doi.org/10.55860/XZDO7563

Corresponding author. *High School Fukuyama. Hiroshima University. Japan.*
E-mail: kenfuku@hiroshima-u.ac.jp
Submitted for publication July 02, 2025.
Accepted for publication August 20, 2025.
Published October 07, 2025.
Sustainability and Sports Science Journal. ISSN 2990-2975.

Identifier: https://doi.org/10.55860/XZDO7563

INTRODUCTION

Ball games in Japanese physical education are generally categorized into three types: goal-type, net-type, and baseball-type games (MEXT, 2018, 2019). According to the national curriculum guidelines, goal-type games include basketball, handball, and soccer, with rugby added at the high school level. Net-type games include volleyball, table tennis, tennis, and badminton. In contrast, only softball is specified as a baseball-type game, making this category unique in that it contains significantly fewer sports options compared to the other two types. Furthermore, previous studies have pointed out that baseball-type games face limitations in terms of equipment and available space, which can restrict the range of activities that can be implemented (Ota et al., 2022). Omuro et al. (2021) also noted that large skill gaps between experienced and inexperienced students make it particularly difficult to teach baseball-type games in physical education classes. These observations suggest that baseball-type games are more challenging to teach and learn than other sports categories and thus improving students' skills in this area requires more effective instructional strategies.

Against this backdrop, there has been a growing body of research focused on improving baseball-type instruction and developing effective teaching materials. For example, Nagai et al. (2021) examined the effects of a lesson that combined the traditional Japanese game "*Rokumushi*"—a tag-like game involving movement between two distant circles while avoiding a thrown ball—with a baseball-type activity for elementary school students. The results suggested that integrating traditional games into baseball-type lessons may contribute to improving students' batting skills. Similarly, Kiyota et al. (2019) investigated the effectiveness of a baseball-type instruction program focused on batting skills and defensive role-play for junior high school students. Their findings revealed that using rubber-tethered toss batting drills during small-sided games significantly improved students' batting skills. Additionally, Yamada and Tsuji (2019) reported that a throwing skill improvement program for elementary school students led to increased interest and affection toward baseball-type games, indicating the program's potential value.

Although such practice-based studies are steadily accumulating, few studies have attempted to comprehensively review and integrate these findings. According to Tanaka and Ichikawa (2011), reviewing and synthesizing previous studies allows researchers to derive comprehensive and significant insights that transcend individual studies. Matsumoto et al. (2022) also emphasized that literature reviews can serve as valuable resources for health and physical education teachers seeking to improve instruction. Likewise, Fukuda et al. (2025) argued that reviewing past practical research provides useful implications for improving physical education classes. Based on these perspectives, conducting a comprehensive review of prior studies on baseball-type instructional practices holds significant value. Such a review can serve as a practical reference for teachers aiming to design more effective baseball-type physical education lessons.

Therefore, the present study aims to examine and organize the challenges of baseball-type games in Japanese physical education by reviewing relevant prior research. Furthermore, this study seeks to contribute to the improvement of baseball-type instruction by identifying key considerations for effective classroom implementation.

METHODS

Survey content

In this study, the focus is placed on issues related to baseball-type activities in physical education classes. Shiraishi et al. (2021), when examining issues in "*body-building exercises*," extracted challenges from three perspectives: (1) learners, (2) instructional materials (content), and (3) teachers. Therefore, in this study as

well, prior research on baseball-type instructional practices was reviewed to extract issues related to at least one of the following perspectives: "*learners*," "*instructional materials (content)*," or "*teachers*." However, it should be noted that these three perspectives are merely used as a lens for identifying issues and are not adopted as analytical frameworks or categorical themes.

Research methods and analytical procedures

To collect previous studies on baseball-type physical education classes, a literature search was conducted using CiNii Articles, a comprehensive database of academic publications operated by the National Institute of Informatics. CiNii is recognized for its excellence in "*comprehensive searches of academic papers*" (Makino, 2020, p.77). Specifically, the keywords "*baseball-type, physical education*" and "*baseball-type, class*" were used, resulting in the extraction of a total of 129 studies (search date: April 16, 2025).

The screening process for the collected studies is illustrated in Figure 1. First, in the primary screening, the type of publication was reviewed, and symposium materials and conference abstracts were excluded. Next, in the secondary screening, the full texts were carefully examined, and studies not related to teaching practices of baseball-type games were removed. Then, in the tertiary screening, duplicate studies were excluded. As a result, 26 relevant studies were identified and included for analysis. All data collection was conducted solely by the author.

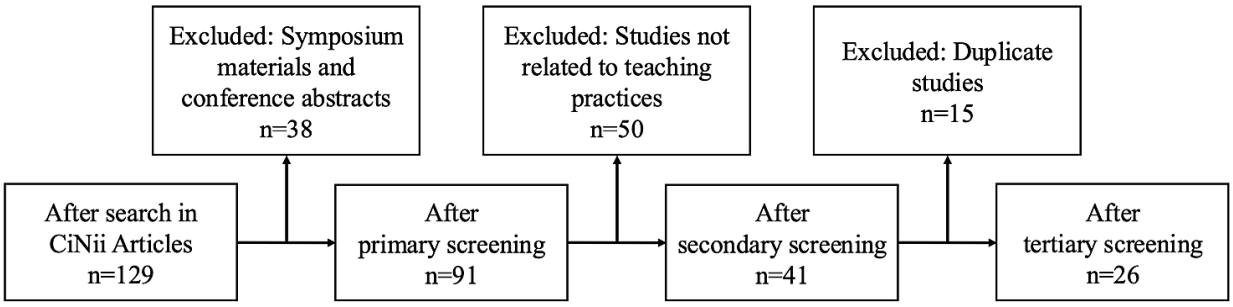


Figure 1. Screening process for selecting previous studies.

The 26 selected previous studies (Table 1) were thoroughly reviewed by the three researchers, each independently, to extract descriptions related to challenges in baseball-type activities from the perspectives of "*learners*," "*instructional materials (content)*," and "*teachers*." The extracted descriptions were then subjected to categorical analysis (Otani, 2019). According to Otani (2019), categorical analysis involves identifying and collecting numerous concepts from a large volume of data and analysing them as a whole. Given the extensive volume of descriptive data involved in examining challenges in baseball-type physical education classes, categorical analysis was deemed appropriate for achieving the objectives of this study.

The specific procedure of categorical analysis was as follows. First, the extracted descriptions were coded by interpreting their content and assigning corresponding codes. Next, subcategories were developed by grouping codes based on their similarities. Then, categories were generated by clustering related subcategories into higher-order themes. Afterward, the proportions of each category were calculated, and challenges in baseball-type physical education lessons were analysed accordingly. To ensure consistency and reliability in the coding process, a retest method (Tsuchiya, 2016) was applied, in which the coding was repeated one month later. In addition, to minimize the risk of data distortion due to researcher subjectivity, investigator triangulation (Flick, 1995, p. 282) was conducted by involving all three researchers in the analysis. Through these procedures, we strived to ensure the content validity of the analysis.

Table 1. List of previous studies analysed in this study.

No	Authors	Year	Article information
1	Furukawa	2013	Development of a baseball-type game unit from the perspectives of "*Developmentally Appropriate Representation*" and "*Exaggeration*". *Educational Practice Research*, 23, 187-192.
2	Inomata	2025	Designing physical education lessons that foster joy and enjoyment. *Report on Educational Practice*, 7, 1-20.
3	Ishii et al.	2009	Considerations on the construction of teaching materials for baseball-type games in elementary. *Educational Practice and Research: Bulletin of the Center for Educational Research and Practice, Faculty of Education: Shinshu University*, (10), 71-80.
4	Iura et al.	2009	Considerations on the development of teaching materials for ball games in elementary school physical education. *Educational Practice and Research: Bulletin of the Center for Educational Research and Practice, Faculty of Education: Shinshu University*, (10), 61-70.
5	Kakite et al.	2018	Empirical research intended to develop independence on baseball lesson of physical education: Focus on "*MANABIAI*" theory. *Journal of Junior High School Education*, 49, 47-52.
6	Kakoi and Mitsumoto	2012	Consideration of method for hitting the moving ball in elementary school physical education classes: Through a case of using "*Synchronized Style of Batting*" in the elementary school upper grades. *Memoirs of Osaka Kyoiku University, Ser.V School Subjects and Allied Problems*, 60(2), 23-30.
7	Kano and Inagaki	2018	Case study of qualitative changing in baseball game as team tag competition. *Bulletin of the Faculty of Education Mie University*, 69, 291-298.
8	Kiyota et al.	2019	Considerations on development and learning outcomes of instructional program intended to improve junior high school girls' game performance of baseball-type games in PE class: Focusing on batting skill and off-the-ball movement of defense in games. *Bulletin of Japan Women's College of Physical Education*, 49, 27-38.
9	Kurihara et al.	2021	A study on the situational judgment during offense in baseball-type games for 5th grades of elementary school. *Bulletin of Nippon Sport Science University*, 50, 2015-2024.
10	Matsumoto	2023	Practical report of softball lesson in high school physical education. *Bulletin of Senior High School at Otsuka University of Tsukuba*, 64, 135-146.
11	Miwa et al.	2017	Zur ausbildung und verbesserung der für baseball typischen spielfähigkeit bei schulkindern. *Journal of the Center for Collaboration and Development in Educational Practice and Management, University of Miyazaki*, (25), 105-117.
12	Mori	2016	A critical examination of striking/fielding type games in the cases of elementary physical education: Balance Ball Baseball as the counterproposal. *Bulletin of the Department of Health and Physical Education: Aichi University of Education*, (41), 1-6.
13	Nadamoto et al.	2017	The effect of learning process systematized by "*Stepping up Task Game*" extracted from tactics of baseball. *The Bulletin of Japanese Curriculum Research and Development*, 39(4), 71-82.
14	Nagai et al.	2021	The effect of physical education class combining traditional play and baseball game on throwing, catching and hitting abilities for fourth graders. *Bullentin of the Colledge of Education Ibaraki University: Educational Sciences*, (70), 111-119.
15	Nakagaki and Okade	2009	Making standard on defensive game performance in baseball type game for junior high school as the case study. *Japanese Journal of Sport Education Studies*, 29(1), 29-39.
16	Nakagawa	2006	A study on unit structure for baseball-type games. *Educational Practice Research*, 16, 119-124.
17	Otsu	2024	Baseball-type practical research in junior high school physical education classes. *Bulletin of the Faculty of Education, Ibaraki University: Educational Science*, (73), 151-169.
18	Saito et al.	2019	Teaching material of every activity in physical education. *Bulletin of the Center for Educational Research and Practice*, (48), 81-88.
19	Sasaki	2015	Aiming for physical education that fosters both enjoyment and skill: A practice of "*baseball-type games*" in the fourth grade. *Bulletin of Koganei Elementary School attached to Tokyo Gakugei University*, 37, 149-152.
20	Seki	2025	A study of physical education lessons that promote growth through peer teaching: Focusing on teacher feedback to athletically skilled students. *Practical Research Report of the Professional School for Teacher Education, Graduate School of Education, Shinshu University*, 21-24.
21	Suzuki	2020	A case study of team tactics in baseball-type games: From a fifth-grade lesson on the "*Hankachi-Otoshi*" game. *Journal of Teaching Material Studies*, 31, 75-82.

22	Takizawa and Kondo	2018	Research on the performance of field players in baseball-type games for 3rd and 4th grade elementary school students: Focus on two main types of games. *NSSU Journal of Sport Sciences*, 7, 1-22.
23	Takizawa et al.	2018	Research on overhand throwing and batting ability in striking and fielding game classes for 3rd grade elementary school students. *Japanese Journal of Sport Education Studies*, 36(1), 17-34.
24	Uchikawa and Tsutsumi	2021	The learning process which makes students get involved better: practical study of ball game junior high school "*Goal Group*" "*Net Group*" "*Baseball Group*". *Educational Practicum Research of Saga University*, (39), 17-28.
25	Yamada and Tsuji	2019	A study of effects of learning of throwing exercise in fourth grade on the learning of baseball-type games in fifth grade. *The Bulletin of Japanese Curriculum Research and Development*, 42(3), 25-39.
26	Yamamoto	2019	Instructional strategies for enhancing game understanding through decision-making in play: A teaching practice of baseball-type games focusing on defensive situations in physical and health education. *Educational Practice Research*, 29, 133-138.

RESULTS

Categories generated as a result of the categorical analysis of the free-text descriptions are indicated by [ ], subcategories are indicated by { }, and codes are indicated by < >. The total number of codes generated was 55 (Table 2). These codes were classified into the following categories: [Skill development] (25.5%), [Deepening of learning] (25.5%), [Lesson design] (21.8%), [Learner support] (18.2%), and [Improvement of teaching methods] (0.1%).

Table 2. Results of category analysis (Number of codes).

[categories]	{subcategories}	<codes>	Example description
Skill Development (14)	Improvement of fielding Skills (6)	Improving fielding-related skills (2)	Improve the defensive skills of fielders.
		Attention to each pitch in defense (1)	Emphasize movements for each pitch in defense.
		Increase practice to expand range (1)	Add practice to expand the range of fielding.
		Reduction of stationary fielders (1)	Reduce learners who remain stationary while fielding.
		Enhancement of catching skills (1)	Emphasize catching as part of fielding skills.
	Mastery of basic movements (5)	Teaching weight transfer methods (2)	Teach how to shift body weight.
		Connection from batting to running (1)	Connect batting with immediate base running.
		Batting using equipment (1)	Bat using appropriate equipment.
		Batting against thrown balls (1)	Hit balls that are thrown.
	Development of tactical judgment (3)	Fostering complex situational judgment (2)	Foster ability to judge complex game situations.
		Easing judgment difficulty (1)	Alleviate the difficulty of making judgments.
Deepening of learning (14)	Examination of analysis methods (8)	Individual analysis of learners (2)	Conduct individual analysis for each student.
		Analysis of knowledge and skills (2)	Analyze changes in knowledge and skills.
		Conducting objective analysis (1)	Perform objective analysis.
		Analysis of teacher's influence (1)	Analyze the teacher's influence.
		Study of tactical knowledge changes (1)	Examine changes in tactical knowledge.
		Gender-based analysis (1)	Conduct analysis by gender.
	Accumulation and	Expansion of sample size (2)	Increase the sample size.

	expansion of research (6)	Accumulation of case examples (2)	Accumulate more case examples.
		Accumulation of evidence (1)	Collect supporting evidence.
		Accumulation of research on judgment (1)	Accumulate studies related to situational judgment.
Lesson Design (12)	Lesson structure and unit planning (7)	Securing unit hours (2)	Secure enough instructional hours.
		Dealing with rainy weather (1)	Consider alternatives for rainy days.
		Unit planning with sequence awareness (1)	Plan units with progression in mind.
		Lesson planning for high school level (1)	Design lessons suitable for high school.
		Incorporating lectures (1)	Include lecture-style teaching.
		Clarifying objectives for each lesson (1)	Clarify objectives for each class.
	Rules and game design (3)	Designing games and rules (1)	Design game formats and rules.
		Rule modifications across unit (1)	Modify rules throughout the unit.
		Game close to official rules (1)	Plan a game close to real softball matches.
	Review of teaching environment (2)	Reducing transition time (1)	Reduce the time needed for transitions.
		Instructions in large spaces (1)	Improve methods for giving instructions in wide spaces.
Learner Support (10)	Ensuring physical activity opportunities (4)	Securing number of at-bats (2)	Ensure sufficient at-bat opportunities.
		Increasing physical activity (1)	Increase learners' physical activity during games.
		Increasing at-bats and fielding chances (1)	Provide more batting and fielding opportunities.
	Consideration for all learners (4)	Designing joyful and enjoyable lessons (2)	Develop lessons that bring joy and fun to all learners.
		Ensuring autonomy of less-skilled learners (1)	Develop support for autonomy in students less skilled at sports.
		Lesson design based on developmental stage (1)	Plan lessons considering students' developmental levels.
	Creating a positive atmosphere (2)	Creating a question-friendly environment (1)	Foster an environment where students can ask questions freely.
		Feedback on successful experiences (1)	Share success experiences with the whole class.
Improvement of teaching methods (5)	Teaching methods and programs (4)	Enhancing batting practice (1)	Improve the quality of batting practice.
		Teaching correct form (1)	Teach proper batting form.
		Reinforcing repetitive practice (1)	Address insufficient repetitive practice.
		Developing effective teaching programs (1)	Develop more effective teaching programs.
	Considering how to utilize ICT (1)		Consider how to utilize ICT effectively in lessons.

DISCUSSION

Based on the results of the category analysis conducted in this study, the challenges observed in the implementation of baseball-type units in physical education classes were classified into five categories: [Skill development], [Deepening of learning], [Lesson design], [Learner support], and [Improvement of teaching methods]. The following section discusses the characteristics and educational implications of each category.

[Skill development] accounted for the largest number of codes (14), indicating that baseball-type games require both advanced individual skills (e.g., hitting, throwing, catching) and team tactics. Subcategories such as {Improvement of fielding skills}, {Mastery of basic movements}, and {Development of tactical judgment}

suggest that teachers are placing emphasis not only on the instruction of individual skills but also on the cultivation of decision-making abilities in game-like situations. This highlights the need to develop "*practical physical competence*," which encompasses not only motor skills but also the cognitive ability to respond appropriately to dynamic situations.

Meanwhile, [Deepening of learning] also accounted for 14 codes, reflecting the strong emphasis on balancing theoretical grounding with empirical validation in baseball-type instruction. Subcategories such as {Examination of analysis methods} and {Accumulation and expansion of research} were frequently cited, indicating a focus on collecting and analysing individual-level data and seeking evidence-based improvements in practice. This demonstrates teachers' commitment to viewing their instructional practice through a research-oriented lens, representing a noteworthy example of promoting reciprocal interaction between educational practice and research.

In the category of [Lesson design], elements such as unit planning, rule setting, and environmental arrangements were widely addressed. In terms of instructional structure, challenges such as <Securing unit hours> and planning with curricular coherence emerged, underscoring the need for sustained and systematic instruction. Additionally, issues such as <Dealing with rainy weather> and effective use of physical space were highlighted, pointing to the importance of lesson management skills that can adapt flexibly to the environmental constraints unique to health and physical education.

In the category of [Learner support], subcategories such as {Consideration for all learners} and {Ensuring physical activity opportunities} were prominent. This suggests that in baseball-type activities—where there is a wide variation in learners' experiences, skill levels, and interests—ensuring opportunities for participation for all learners is a critical issue. In particular, the emphasis on support for students who struggle with physical activity and the sharing of successful experiences to enhance self-efficacy reflects a learner-centred perspective on instruction.

Finally, the category of [Improvement of teaching methods] included suggestions for improving instructional content directly related to skill development, such as batting practice and form correction. References to the use of ICT were also found, indicating the potential for feedback and motion analysis supported by technology. This points to a shift toward a new vision of physical education that integrates technological tools alongside traditional teaching methods.

In summary, the implementation of baseball-type units in physical education reveals a range of multifaceted challenges that must be addressed in an interconnected manner. In particular, a balanced approach that simultaneously emphasizes skill instruction, lesson structure, learner support, and research-based validation is essential for building higher-quality physical education lessons.

CONCLUSION

The purpose of this study was to clarify the challenges associated with baseball-type activities in physical education classes through a review of instructional practice-based research. To this end, 26 previous studies were analysed, and descriptions related to challenges in instructional practice were extracted. Subsequently, a category analysis was conducted focusing on the similarities among these descriptions. The following three key findings were obtained:

1. Previous studies on baseball-type activities in physical education classes were predominantly conducted at the elementary school level, with relatively few targeting high school students.

2. The challenges that arise in the implementation of baseball-type units in physical education classes can be categorized into five groups: [Skill Development], [Deepening of Learning], [Lesson Design], [Learner Support], and [Improvement of Teaching Methods].
3. Among these categories, a particularly high number of descriptions pertained to [Skill Development] and [Deepening of Learning], indicating the importance of areas such as {Mastery of Basic Movements} and {Accumulation and Expansion of Research} as key issues to be addressed in the future.

While this study yielded the above findings, it also revealed several limitations. First, the analysis did not differentiate between school levels. Although 26 studies were included in the analysis, the majority of them focused on elementary school practice. As such, the challenges identified in this study may primarily reflect those encountered at the elementary level. To design a more systematic approach to baseball-type instruction, it would be beneficial to classify prior research according to school level. Second, the number of studies analysed was relatively limited. In this study, literature was collected primarily using CiNii Articles. However, other sources such as Google Scholar and institutional repositories (e.g., IRDB) are also available for literature collection. To gain a more comprehensive understanding of the challenges surrounding baseball-type instruction in physical education, future research should consider utilizing a broader range of sources. These points remain issues for future investigation.

SUPPORTING AGENCIES

No funding agencies were reported by the author.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author.

REFERENCES

Flic, U. (1995). Qualitative Forschung (H. Oda, N. Yamamoto, T. Kasuga & N. Miyazi, Trans.). Shunjusha Publishing. (in Japanese)

Fukuda, K., Goda D., Takata, M., Nobuhara, T., Fujimura, K. & Horike, M. (2025). A review of research on health and physical education teaching practices in integrated junior and senior high school education: Foundational insights derived from "Bulletin of Secondary Education Studies / Hiroshima University High School Fukuyama". Bulletin of Secondary Education Studies / Hiroshima University High School Fukuyama, 65, 95-107 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://hiroshima.repo.nii.ac.jp/records/2040543

Furukawa, K. (2013). Development of a baseball-type game unit from the perspectives of "Developmentally Appropriate Representation" and "Exaggeration". Educational Practice Research, 23, 187-192 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://juen.repo.nii.ac.jp/records/6380

Inomata, M. (2025). Designing physical education lessons that foster joy and enjoyment. Report on Educational Practice, 7, 1-20 (in Japanese).

Ishii, K., Ono, T., Takeuchi, T., Iwata, Y. & Tsuchiya, K. (2009). Considerations on the construction of teaching materials for baseball-type games in elementary. Educational Practice and Research: Bulletin of the Center for Educational Research and Practice, Faculty of Education: Shinshu University, (10), 71-80 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://soar-ir.repo.nii.ac.jp/records/1995

Iura, T., Iwata, Y. & Takeuchi, T. (2009). Considerations on the development of teaching materials for ball games in elementary school physical education. Educational Practice and Research: Bulletin of the Center for Educational Research and Practice, Faculty of Education: Shinshu University, (10), 61-70 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://soar-ir.repo.nii.ac.jp/records/1994

Kakite, N., Hamamoto, A. & Iwata, S. (2018). Empirical research intended to develop independence on baseball lesson of physical education: Focus on "MANABIAI" theory. Journal of Junior High School Education, 49, 47-52 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://hiroshima.repo.nii.ac.jp/records/2024733

Kakoi, D. & Mitsumoto, M. (2012). Consideration of method for hitting the moving ball in elementary school physical education classes: Through a case of using "Synchronized Style of Batting" in the elementary school upper grades. Memoirs of Osaka Kyoiku University, Ser.V School Subjects and Allied Problems, 60(2), 23-30 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://osaka-kyoiku.repo.nii.ac.jp/records/2095442

Kano, T. & Inagaki, T. (2018). Case study of qualitative changing in baseball game as team tag competition. Bulletin of the Faculty of Education Mie University, 69, 291-298 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://mie-u.repo.nii.ac.jp/records/11832

Kiyota, A., Shibayama, A. & Suko, R. (2019). Considerations on development and learning outcomes of instructional program intended to improve junior high school girls' game performance of baseball-type games in PE class: Focusing on batting skill and off-the-ball movement of defense in games. Bulletin of Japan Women's College of Physical Education, 49, 27-38 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://jwcpe.repo.nii.ac.jp/records/994

Kuribara, A., Takizawa, Y., Kubo, K. & Kondo, T. (2021). A study on the situational judgment during offense in baseball-type games for 5th grades of elementary school. Bulletin of Nippon Sport Science University, 50, 2015-2024 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://nittaidai.repo.nii.ac.jp/records/1813

Makino, K. (2020). Management accounting research of small and medium enterprises: Integration attempt by systematic review. The Journal of Management Accounting, 28(1), 71-95 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://www.jstage.jst.go.jp/article/jma/28/1/28_71/_article/-char/ja/

Matsumoto, H. (2023). Practical report of softball lesson in high school physical education. Bulletin of Senior High School at Otsuka University of Tsukuba, 64, 135-146 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://tsukuba.repo.nii.ac.jp/records/2006486

Matsumoto, Y., Shiraishi, T. & Saito, K. (2022). Outcomes of long-distance racing classes: A literature review focusing on students' attitude toward long-distance racing. Hiroshima Journal of Physical Education, 48, 1-14 (in Japanese). Retrieved from [Accessed 2025, 22 August]: http://www.hspe.jp/pdf/journal48_02.pdf

MEXT (2018). Commentary on the course of study for junior high school: Health and physical education. Higashiyama Shobo Publishing (in Japanese).

MEXT (2019). Commentary on the course of study for senior high school: Health and physical education, Physical education. Higashiyama Shobo Publishing (in Japanese).

Miwa, Y., Nobe, M., Takahashi, T., Nishida, E., Takahashi, Y., Narematsu, I. & Hidaka, M. (2017). Zur ausbildung und verbesserung der für baseball typischen spielfähigkeit bei schulkindern. Journal of the Center for Collaboration and Development in Educational Practice and Management, University of Miyazaki, (25), 105-117 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://miyazaki-u.repo.nii.ac.jp/records/5115

Mori, Y. (2016). A critical examination of striking/fielding type games in the cases of elementary physical education: Balance Ball Baseball as the counterproposal. Bulletin of the Department of Health and

Physical Education: Aichi University of Education, (41), 1-6 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://aue.repo.nii.ac.jp/records/5906

Nadamoto, M., Yamashita, M., Hidaka, M. & Goto, Y. (2017). The effect of learning process systematized by "Stepping up Task Game" extracted from tactics of baseball. The Bulletin of Japanese Curriculum Research and Development, 39(4), 71-82 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://www.jstage.jst.go.jp/article/jcrdajp/39/4/39_71/_pdf/-char/ja

Nagai, R., Yuse, H., Kashimura, T. & Watanabe, M. (2021). The effect of physical education class combining traditional play and baseball game on throwing, catching and hitting abilities for fourth graders. Bullentin of the Colledge of Education Ibaraki University: Educational Sciences, (70), 111-119 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://rose-ibadai.repo.nii.ac.jp/records/18952

Nakagaki, T. & Okade, Y. (2009). Making standard on defensive game performance in baseball type game for junior high school as the case study. Japanese Journal of Sport Education Studies, 29(1), 29-39 (in Japanese). https://doi.org/10.7219/jjses.29.1_29

Nakagawa, M. (2006). A study on unit structure for baseball-type games. Educational Practice Research, 16, 119-124 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://juen.repo.nii.ac.jp/records/5226

Omuro, K., Higuchi, T. & Kanosue, K. (2021). Reproducibility of bat swing for unskilled baseball novices: comparison of dry swing and tee batting. Research in Sports Science, 18, 85-96 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://waseda.repo.nii.ac.jp/records/75763

Ota, M., Koide, M., Iwama, K., Suzuki, Y. & Kizuka, T. (2022). Implementation and challenges in offering baseball-type lessons in elementary school physical education. Japan Journal for the Pedagogy of Physical Education, 38(2), 13-25 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://www.jstage.jst.go.jp/article/jsppe/38/2/38_38-2-02/_article/-char/ja/

Otani, T. (2019). Paradigm and design of qualitative study: From research methodology to SCAT. Nagoya University Press (in Japanese).

Otsu, N. (2024). Baseball-type practical research in junior high school physical education classes. Bulletin of the Faculty of Education, Ibaraki University: Educational Science, (73), 151-169 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://rose-ibadai.repo.nii.ac.jp/records/2000687

Saito, M., Hatano, Y., Yoshimura, M. & Ikehara, T. (2019). Teaching material of every activity in physical education. Bulletin of the Center for Educational Research and Practice, (48), 81-88 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://petit.lib.yamaguchi-u.ac.jp/28087

Sasaki, K. (2015). Aiming for physical education that fosters both enjoyment and skill: A practice of "baseball-type games" in the fourth grade. Bulletin of Koganei Elementary School attached to Tokyo Gakugei University, 37, 149-152 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://u-gakugei.repo.nii.ac.jp/records/34175

Seki, Y. (2025). A study of physical education lessons that promote growth through peer teaching: Focusing on teacher feedback to athletically skilled students. Practical Research Report of the Professional School for Teacher Education, Graduate School of Education, Shinshu University, 21-24 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://soar-ir.repo.nii.ac.jp/records/2002689

Shiraishi, T., Matsumoto, Y. & Fujishima, R. (2021). A review of research on "Physical Fitness" in junior high schools and high schools: Toward improving the quality of learning in physical education teacher training courses. Research in Human Health Sciences, 4, 1-11 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://hbg.repo.nii.ac.jp/records/4923

Suzuki, K. (2020). A case study of team tactics in baseball-type games: From a fifth-grade lesson on the "Hankachi-Otoshi" game. Journal of Teaching Material Studies, 31, 75-82 (in Japanese). Retrieved

from [Accessed 2025, 22 August]: https://www.jstage.jst.go.jp/article/kyozai/31/0/31_75/_article/-char/ja/

Takizawa, Y. & Kondo, T. (2018). Research on the performance of field players in baseball-type games for 3rd and 4th grade elementary school students: Focus on two main types of games. NSSU Journal of Sport Sciences, 7, 1-22 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://nittaidai.repo.nii.ac.jp/records/1500

Takizawa, Y., Okada, Y., Wada, H., Shirahata, K. & Kondo, T. (2018). Research on overhand throwing and batting ability in striking and fielding game classes for 3rd grade elementary school students. Japanese Journal of Sport Education Studies, 36(1), 17-34 (in Japanese). https://doi.org/10.7219/jjses.38.1_53

Tanaka, M. & Ichikawa, S. (2011). On the process of conducting a good review study: Tips from a "lecturer-like activity" at the university of Tokyo. Bulletin of the Graduate School of Education: The University of Tokyo, 51, 203-215 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://repository.dl.itc.u-tokyo.ac.jp/records/31132

Tsuchiya, M. (2016). Thematic Analysis: Foundations of coding for interview data analysis. Nakanishiya Publishing (in Japanese).

Uchikawa, R. & Tsutsumi, K. (2021). The learning process which makes students get involved better: practical study of ball game junior high school "Goal Group" "Net Group" "Baseball Group". Educational Practicum Research of Saga University, (39), 17-28 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://saga-u.repo.nii.ac.jp/records/22966

Yamada, J. & Tsuji, N. (2019). A study of effects of learning of throwing exercise in fourth grade on the learning of baseball-type games in fifth grade. The Bulletin of Japanese Curriculum Research and Development, 42(3), 25-39 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://www.jstage.jst.go.jp/article/jcrdajp/42/3/42_25/_pdf/-char/ja

Yamamoto, K. (2019). Instructional strategies for enhancing game understanding through decision-making in play: A teaching practice of baseball-type games focusing on defensive situations in physical and health education. Educational Practice Research, 29, 133-138 (in Japanese). Retrieved from [Accessed 2025, 22 August]: https://juen.repo.nii.ac.jp/records/8071

SUSTAINABILITY & SPORTS SCIENCE JOURNAL

REVIEW ARTICLE

New approaches to identifying postural deviation in adolescence: Literature review

Tedi Prifti . *Department of Education and Health. Faculty of Movement Sciences. Sports University of Tirana. Albania*.
Robert Çina. *Department of Rehabilitation. Faculty of Rehabilitation Sciences. Sports University of Tirana. Albania*.

ABSTRACT

The issues of improving postural deviations continue to be controversial. Exercise programs are effective in correcting postural deviations from adolescence. Method; Study sources and inclusion criteria are: Scopus, Google Scholar, PubMed and Web of Science which were used as sources for collecting data for our investigation. The keywords used were; "*posture*", "*scoliosis*", "*body position*", "*deviations*", "*exercises program*", "*adolescents and adults*". The studies were selected in full and abstract from the last 10 years published in both English and Spanish based on our criteria. Results; From our database search, 115 studies were collected that were suitable for our needs based on the implementation of the study methodology, and after a more thorough evaluation, 27 full-text studies were finally selected as suitable for this review. Conclusion; The way we see and treat postural deviations is a fundamental aspect of our health care and well-being. An important aspect of this study is the use of rehabilitation therapy as part of an integrated medical plan. This review showed that the use of innovative methods in identifying postural deviations and rehabilitation therapy brings a significant improvement in the health and well-being of subjects.
Keywords: Posture, Scoliosis, Body position, Deviations, Exercises program, Adolescents, Adults.

Cite this article as:
Prifti, T., & Çina, R. (2026). New approaches to identifying postural deviation in adolescence: Literature review. *Sustainability and Sports Science Journal*, *4*(1), 25-31. https://doi.org/10.55860/SMOO5927

Corresponding author. *Department of Education and Health. Faculty of Movement Sciences. Sports University of Tirana. Albania.*
E-mail: tprifti@ust.edu.al
Submitted for publication August 23, 2025.
Accepted for publication October 07, 2025.
Published October 24, 2025.
Sustainability and Sports Science Journal. ISSN 2990-2975.

Identifier: https://doi.org/10.55860/SMOO5927

INTRODUCTION

Understanding the evolution of postural changes, bipedal locomotion, and their implications for human evolution has also been supported by an understanding of evolutionary changes in ape anatomy, particularly in spinal morphology (Rolian, 2020). In a detailed review of hominoid spinal features, Lovejoy (2005) highlighted important evolutionary features of the human spine and pelvis between the "long spine" and the "*short spine*," the latter group characterized by adaptations that aid lower limb movement. These adaptations lead to a reduction in the number of lumbar vertebrae, changes in the morphology of the thorax and scapula, and the locking of the last two vertebrae between the iliac crests.

Fossils of hominids and apes (Thompson & Almécija, 2017) found that, contrary to the short-spine scenario, the idea of a long-spine scenario is not supported and was reconstructed with only four lumbar vertebrae and thirty thoracic vertebrae. It appears that this change reduced the mobility of the lower spine, which promoted a persistent incorrect habit of upright posture. Weight support and foot position are two important trade-offs in the transition from previous walking to bipedalism. Bipedal humans, i.e., with extended legs, have lower energy costs, greater endurance, and the ability to forage over greater distances compared to non-human primates, who maintain flexion of the legs to reduce their load (Raichlen & Pontzer, 2021). The definition of "*body position*" has changed over time, starting as a noun and ending as a medical term used to describe a person's general health condition. In the field of medicine, orthopaedics is developing, which uses proper posture to diagnose diseases and determine a person's health condition (Gilman, 2013). In addition to defining proper posture, there are other deviations that are important, such as hyperkyphosis, hyperlordosis, and a slouched position that deviates from the ideal position, which is the military stance. Many techniques for correcting poor posture have begun to be developed, along with a discussion of good and bad posture (Malpas, 2004), using a variety of orthopaedic devices to mechanically address issues related to low posture, such as in children.

Having a correct posture improves physical health, but more than that, it is said that a bad posture can lead to fatigue and injuries that can cause long-term problems, so studies aim to show that the human body can prevent the development of pain or injuries and increase the quality of life (Araújo et al., 2014). A significant shift or deviation from the typical position in the body's kinetic chain is called postural deviation. This phenomenon can lead to biomechanical stress and limit the body's capacity to resist stresses (Schamberger, 2016).

School-age children and adolescents are more likely to experience postural deviations; while some changes are normal during growth, puberty, and human development, they can have a negative impact on a person's quality of life (Schwanke et al., 2016). Aging can also cause postural deviations, which can limit pulmonary function and quality of life (Bansal et al., 2014). Significant deviation from ideal posture can also affect a person's ability to move their muscles efficiently, making them more vulnerable to neurological or musculoskeletal conditions (Hrysomallis & Goodman, 2001). Postural misalignment of the head, shoulders, and spine affects many biomechanical characteristics, motor control, and performance, which is why doctors believe that measuring it is important (Claus et al., 2016). Various studies suggest that exercise can correct these postural deviations. It is interesting to note that, although it is included in large-scale exercise programs, postural correction has very little conflicting or experimental data to support its efficacy, and it is unclear whether any given exercise program is the most effective (Harman et al., 2005).

In conclusion, this systematic review aims to fully examine the efficacy of exercise programs on improving and correcting postural deviations.

METHODOLOGY

This literature review was conducted using recommendations from a meta-analysis. Since the data used in this study came from previous research that had received ethics board approval, this approval was not necessary for us. The study data were processed using Microsoft Excel.

Study sources

The bibliographic databases we used are; Scopus, Google Scholar, PubMed and Web of Science which were used as sources for the literature review in order to collect data for our investigation.

Inclusion criteria

Keywords used in the selection of studies; "*posture*", "*scoliosis*", "*body position*", "*deviations*", "*exercises program*", "*adolescents and adults*", which were among the terms included in the search strategy due to their relevance to health. The studies were selected in full and abstract form from the last 10 years published in both English and Spanish.

After selecting abstracts and scientific articles, we determined the most important details, such as methodology and main findings. We identified 115 studies that were suitable for our needs in the initial searches we conducted. Studies that did not meet the inclusion requirements were not considered from the list.

RESULTS

From our database search, 115 studies were collected that were suitable for our needs based on the implementation of the study methodology, and after a more thorough evaluation, 27 full-text studies were finally selected as suitable for this review.

Microsoft Excel was used to enter publication characteristics (year of publication, type of study), study characteristics, etc.

All studies were selected from the bibliographic databases; Scopus, Google Scholar, PubMed and Web of Science

DISCUSSIONS

Due to the lack of relevant and reliable data collected under controlled circumstances, two previous studies found limited evidence to support the claim that exercise interventions will improve postural deviations (Bansal et al., 2014; Hrysomallis & Goodman, 2001). Exercise is beneficial in correcting postural deviations, according to two recent systematic reviews and a meta-analysis (González-Gálvez et al., 2019; Sheikhhoseini et al., 2018). Although the details of the improvement are still unknown, one study showed that physiotherapeutic activities could lead to modifications in trunk postural deviation (Sheikhhoseini et al., 2018).

It appears that practitioners need evidence-based guidance on appropriate exercises for people with postural deviations. Most of these have been limited to specific deviations and participants (such as adolescents with scoliosis) or individuals with hyper kyphosis (Bansal et al., 2014) or lordosis (Hrysomallis & Goodman, 2001). In the various research studies conducted, exercise therapies for postural deviations have shown some

beneficial advantages in most of the literature reviews reported in the last 23 years. The most effective outcome for correcting postural deviations would come from an improvement and correction program that aims to address both neurological and muscular components and that is implemented three times a week for at least six weeks, with a duration of 15 to 60 minutes per session.

There is a 10% increase in the risk of a first-degree relative with scoliosis, suggesting that the disease may have a genetic basis, although the exact genetic factors are still unknown (Gorman et al. (2012); Sharma et al. (2011). In otherwise healthy children and adolescents, asymmetry of the chest and trunk is often observed, which is the basis for the physical examination of scoliosis. According to Bunnell (1993), only 1.6% of high school students are completely symmetrical. Of over two thousand children evaluated as part of a school screening program, 4.1% showed improvement based on visual assessment in both static and forward bending positions (forward bending test, Adams) and measurements of the rib cage; 1.8% showed signs of idiopathic scoliosis over ten degrees, and 0.4% required active treatment (Yawn, 1999).

The main consequences of scoliosis in growing children are lateral trunk deformities due to trunk or rib rotation, trunk imbalance, and shoulder or lumbar asymmetry. For most patients, idiopathic scoliosis does not progress. Studies on the natural history of scoliosis have shown that deformities below thirty degrees, at the end of growth, never worsen in adults, while deformities above fifty degrees are observed to deteriorate at a rate of 0.75 to 1.00 degrees per year in adults. As a result, the patient who has scoliosis above 25 to 30 degrees and an immature skeleton is susceptible to further development. Development of the thoracic arch in pre-adolescents is necessary to achieve adult chest volume, as lung volume almost doubles from the age of 10 years to skeletal maturity (Diméglio & Canavese, 2011).

Compared with age-matched norms, adolescents with thoracic scoliosis greater than 50 degrees have a higher chance of experiencing dyspnoea later in life (hazard ratio, approximately 15% at 30 years of follow-up and 4% at 50 years of follow-up). As idiopathic thoracic scoliosis approaches 70 degrees, lung capacity is reduced compared with norms, and patients with a deformity greater than 100 degrees are likely to have symptomatic restrictive pulmonary disease (Johnston et al., 2011). However, these are very rare and extreme cases.

Determining skeletal maturity is important for predicting the likelihood of scoliosis progression. Growth velocity and the likelihood of scoliosis progression are correlated, as determined by serial height assessments. The year before menarche is when girls reach their peak growth velocity. In the absence of consistent data, radiography is used to determine bone age by assessing skeletal maturity and bone density. A skeletal maturity score has been developed that takes into account the degree of deviation and phalangeal physical appearance. Based on limited data, this score may indicate the likelihood of developing scoliosis that requires surgical intervention (Sanders et al., 2008). If the patient has reached skeletal maturity, which is defined as a bone age of 15 years for females and 17 years for males, progression of spinal deviation is unusual if the magnitude is below 30 degrees.

Scoliosis is a complex deformity of the trunk in all dimensions. In addition to being recognized by the trunk deformities in the sagittal plane, it is diagnosed by measuring the angle of the spinal curve (a Cobb angle of at least 10º) in the frontal plane and the axial rotation in the horizontal plane (Illés et al., 2019; "*Adolescent Idiopathic Scoliosis*," s. f.). In children affected by a general health condition, it is a structural, lateral, deformity of the spine that develops around puberty (Peng et al., 2020). Although scoliosis can be diagnosed at any age, most cases are detected during adolescence, between 10 and 18 years of age (Négrini et al., 2018). According to Seleviciene et al. (2022b) and Fruergaard et al. (2019), scoliosis is the most common spinal

deformity in children who do not engage in physical activity. According to estimates by the International Society for Scoliosis Orthopaedic Treatment and Rehabilitation (SOSORT), the incidence of adolescent idiopathic scoliosis (AIS) in the paediatric population ranges from 0.93% to 12% worldwide (Négrini et al., 2018).

The SOSORT consensus considers "*3D autocorrection*" as the most important component to be included in the exercises. According to Negrini et al. (2018), autocorrection is the process of trying to integrate the patient as best as possible in each of the three spatial planes. PSSE treatment assessment can be performed from two to seven days a week, depending on the complexity of the approach, the patients' needs, and their capacity to follow the recommended regimen. According to Négrini et al. (2018), if the patient is willing to participate, daily outpatient sessions are usually held two to four times a week. Physical activities are selected according to the type and degree of scoliosis in each patient, and the exercises themselves are based on the methodology used (Négrini et al., 2018). For this type of physiotherapy, only professionally trained physiotherapists are usually used, and their methods are similar to each other, and attention is paid to positional awareness, breathing exercises, implementation of corrective exercises in three planes, and establishing stability and balance.

The GYROTONIC® Extension System is a unique, movement-based approach. Some of the benefits of regular Gyrotonic practice include a healthier and more flexible spine, increased mobility, greater joint stability, better speed and athletic performance, and deep core strength. The Gyrotonic Extension System involves three-dimensional (3D) movement of the spine that not only improves its functional movement but also increases muscular strength and flexibility around the spine. Unlike many traditional exercise methods that focus primarily on linear movement, Gyrotonic exercises promote movement in all three planes of motion: flexion/extension, lateral movement, and rotation. This multidimensional approach helps increase range of motion and functional strength. However, further high-quality research is still needed, as current evidence is insufficient to support the superiority of one particular physiotherapy technique over another.

Patients, healthcare professionals, and rehabilitation centres should be aware of practical and effective intervention techniques with exercises that provide specific details for reducing or eliminating postural deviations.

CONCLUSION

The way we see and treat postural deviations is a fundamental aspect of our health care and well-being. The incorporation of advanced technology, such as electronic devices and computer analysis, has enabled an in-depth look at the structures and functions of the body. An important aspect of this study is the use of rehabilitation therapy as part of an integrated medical plan. Innovative rehabilitation methods have served as a powerful instrument in restoring normal body function and improving postural positioning. This review showed that the use of innovative methods in identifying postural deviations and rehabilitation therapy brings a significant improvement in the health and well-being of subjects. Each method has its specific use and its own role in assessing and monitoring the health of patients, bringing valuable contributions to modern medicine.

AUTHOR CONTRIBUTIONS

The contribution to this review is joint, where Tedi Prifti is a PhD candidate and Prof. Dr. Robert Çina his scientific leader. PhD. Can. T. Prifti implemented every instruction on scientific research, directed by his scientific leader.

SUPPORTING AGENCIES

No funding agencies were reported by the authors.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

REFERENCES

Araújo, F., Lucas, R., Alegrete, N., Azevedo, A., & Barros, H. (2014). Sagittal standing posture, back pain, and quality of life among adults from the general population. Spine, 39(13), E782-E794. https://doi.org/10.1097/BRS.0000000000000347

Bansal, S., Katzman, W. B., & Giangregorio, L. M. (2013). Exercise for Improving Age-Related Hyperkyphotic Posture: A Systematic Review. Archives of Physical Medicine and Rehabilitation, 95(1), 129-140. https://doi.org/10.1016/j.apmr.2013.06.022

Bunnell, W. P. (1993). Outcome of spinal screening. Spine, 18(12), 1572-1580. https://doi.org/10.1097/00007632-199309000-00001

Claus, A. P., Hides, J. A., Moseley, G. L., & Hodges, P. W. (2015). Thoracic and lumbar posture behaviour in sitting tasks and standing: Progressing the biomechanics from observations to measurements. Applied Ergonomics, 53, 161-168. https://doi.org/10.1016/j.apergo.2015.09.006

Dimeglio, A., & Canavese, F. (2011). The growing spine: how spinal deformities influence normal spine and thoracic cage growth. European Spine Journal, 21(1), 64-70. https://doi.org/10.1007/s00586-011-1983-3

Fruergaard, S., Ohrt-Nissen, S., Dahl, B., Kaltoft, N., & Gehrchen, M. (2018). Neural axis abnormalities in patients with adolescent idiopathic scoliosis: Is routine magnetic resonance imaging indicated irrespective of curve severity? Neurospine, 16(2), 339-346. https://doi.org/10.14245/ns.1836154.077

Gilman, S. L. (2013). "Stand Up Straight": notes toward a history of posture. Journal of Medical Humanities, 35(1), 57-83. https://doi.org/10.1007/s10912-013-9266-0

González-Gálvez, N., Gea-García, G. M., & Marcos-Pardo, P. J. (2019). Effects of exercise programs on kyphosis and lordosis angle: A systematic review and meta-analysis. PLoS ONE, 14(4), e0216180. https://doi.org/10.1371/journal.pone.0216180

Gorman, K. F., Julien, C., & Moreau, A. (2012). The genetic epidemiology of idiopathic scoliosis. European Spine Journal, 21(10), 1905-1919. https://doi.org/10.1007/s00586-012-2389-6

Harman, K., Hubley-Kozey, C. L., & Butler, H. (2005). Effectiveness of an exercise program to improve forward head posture in normal adults: a randomized, controlled 10-Week trial. Journal of Manual & Manipulative Therapy, 13(3), 163-176. https://doi.org/10.1179/106698105790824888

Hrysomallis C, Goodman C. A review of resistance exercise and posture realignment. J Strength Cond Res. 2001 Aug;15(3):385-90. PMID: 11710670. https://doi.org/10.1519/00124278-200108000-00022

Illés, T. S., Lavaste, F., & Dubousset, J. F. (2019). The third dimension of scoliosis: The forgotten axial plane. Orthopaedics & Traumatology Surgery & Research, 105(2), 351-359. https://doi.org/10.1016/j.otsr.2018.10.021

Johnston, C. E., Richards, B. S., Sucato, D. J., Bridwell, K. H., Lenke, L. G., & Erickson, M. (2011). Correlation of preoperative deformity magnitude and pulmonary function tests in adolescent idiopathic scoliosis. Spine, 36(14), 1096-1102. https://doi.org/10.1097/BRS.0b013e3181f8c931

Lovejoy, C. (2005). The natural history of human gait and posturePart 1. Spine and pelvis. Gait & Posture, 21(1), 95-112. https://doi.org/10.1016/S0966-6362(04)00014-1

Malpas, C. (2004). Jules Guérin Makes his Market: the Social Economy of Orthopaedic Medicine in Paris, c. 1825-1845. In Palgrave Macmillan UK eBooks (pp. 148-170). https://doi.org/10.1057/9780230287594_9

Negrini, S., Donzelli, S., Aulisa, A. G., Czaprowski, D., Schreiber, S., De Mauroy, J. C., Diers, H., Grivas, T. B., Knott, P., Kotwicki, T., Lebel, A., Marti, C., Maruyama, T., O'Brien, J., Price, N., Parent, E., Rigo, M., Romano, M., Stikeleather, L., . . . Zaina, F. (2018). 2016 SOSORT guidelines: orthopaedic and rehabilitation treatment of idiopathic scoliosis during growth. Scoliosis and Spinal Disorders, 13(1). https://doi.org/10.1186/s13013-017-0145-8

Peng, Y., Wang, S., Qiu, G., Zhang, J., & Zhuang, Q. (2020). Research progress on the etiology and pathogenesis of adolescent idiopathic scoliosis. Chinese Medical Journal, 133(4), 483-493. https://doi.org/10.1097/CM9.0000000000000652

Raichlen, D. A., & Pontzer, H. (2021). Energetic and endurance constraints on great ape quadrupedalism and the benefits of hominin bipedalism. Evolutionary Anthropology Issues News and Reviews, 30(4), 253-261. https://doi.org/10.1002/evan.21911

Rolian, C. (2019). Ecomorphological specialization leads to loss of evolvability in primate limbs*. Evolution, 74(4), 702-715. https://doi.org/10.1111/evo.13900

Sanders, J. O., Khoury, J. G., Kishan, S., Browne, R. H., Mooney, J. F., Arnold, K. D., McConnell, S. J., Bauman, J. A., & Finegold, D. N. (2008). Predicting Scoliosis Progression from Skeletal Maturity: A Simplified Classification During Adolescence. Journal of Bone and Joint Surgery, 90(3), 540-553. https://doi.org/10.2106/JBJS.G.00004

Schamberger, W. (2015). Malalignment syndrome in runners. Physical Medicine and Rehabilitation Clinics of North America, 27(1), 237-317. https://doi.org/10.1016/j.pmr.2015.08.005

Schwanke, N. L., Pohl, H. H., Reuter, C. P., Borges, T. S., De Souza, S., & Burgos, M. S. (2015). Differences in body posture, strength and flexibility in schoolchildren with overweight and obesity: A quasi-experimental study. Manual Therapy, 22, 138-144. https://doi.org/10.1016/j.math.2015.11.004

Seleviciene, V., Cesnaviciute, A., Strukcinskiene, B., Marcinowicz, L., Strazdiene, N., & Genowska, A. (2022). Physiotherapeutic Scoliosis-Specific Exercise Methodologies used for conservative treatment of adolescent idiopathic scoliosis, and their effectiveness: An Extended literature review of current research and practice. International Journal of Environmental Research and Public Health, 19(15), 9240. https://doi.org/10.3390/ijerph19159240

Sharma, S., Gao, X., Londono, D., Devroy, S. E., Mauldin, K. N., Frankel, J. T., Brandon, J. M., Zhang, D., Li, Q., Dobbs, M. B., Gurnett, C. A., Grant, S. F., Hakonarson, H., Dormans, J. P., Herring, J. A., Gordon, D., & Wise, C. A. (2011). Genome-wide association studies of adolescent idiopathic scoliosis suggest candidate susceptibility genes. Human Molecular Genetics, 20(7), 1456-1466. https://doi.org/10.1093/hmg/ddq571

Sheikhhoseini, R., Shahrbanian, S., Sayyadi, P., & O'Sullivan, K. (2018). Effectiveness of therapeutic exercise on forward head posture: A Systematic review and Meta-analysis. Journal of Manipulative and Physiological Therapeutics, 41(6), 530-539. https://doi.org/10.1016/j.jmpt.2018.02.002

Thompson, N. E., & Almécija, S. (2017). The evolution of vertebral formulae in Hominoidea. Journal of Human Evolution, 110, 18-36. https://doi.org/10.1016/j.jhevol.2017.05.012

Yawn, B. P. (1999). A Population-Based Study of School scoliosis Screening. JAMA, 282(15), 1427. https://doi.org/10.1001/jama.282.15.1427

SUSTAINABILITY & SPORTS SCIENCE JOURNAL

ORIGINAL ARTICLE

The impact of entrepreneurship on developing innovative methodologies in sports education sciences within the framework of sustainable development

Ali Abdul Amir Al-Hasnawi . *Faculty of Physical Education and Science Sport. Hilla University. Iraq. Faculty of Sports Sciences. Alexandria University. Egypt.*
Mayasa Abd Ali Kadhim. *College of Education and Sports Sciences. University of Kufa. Iraq.*
Lamyaa Hasan Aldewan. *College of Education and Sports Sciences. University of Basrah. Iraq.*
Mohammed Asim Ghazi. *Faculty of Sports Sciences. Alexandria University. Egypt.*
Mazin Hadi Kzar. *College of Education and Sports Sciences. University of Basrah. Iraq.*
Mazin Abdul Hedi Ahmed. *Faculty of Physical Education and Sports Sciences. University of Hillah. Babylon, Iraq.*

ABSTRACT

This study explores the role of entrepreneurship in shaping innovative methodologies within sports education sciences, aligned with the principles of sustainable development. The research highlights how entrepreneurial thinking fosters creativity, adaptability, and forward-thinking strategies in physical education and sports sciences, promoting more dynamic, student-centred learning environments. Emphasizing interdisciplinary approaches, the study underscores the integration of digital tools, innovative training programs, and sustainable practices that contribute to the holistic development of learners. It further investigates the impact of entrepreneurial initiatives on curriculum enhancement, professional development, and the broader educational ecosystem. Through a comprehensive review of current trends and case studies, the research identifies key drivers of innovation, such as technological integration, community engagement, and resource optimization. The findings advocate for a shift toward educational models that not only respond to contemporary challenges but also anticipate future needs. This paradigm supports the cultivation of critical thinking, leadership, and problem-solving skills among students and educators alike. Ultimately, the study recommends the adoption of entrepreneurial principles as a foundational element in reforming sports education systems, aiming to align them with the United Nations Sustainable Development Goals (SDGs), particularly in fostering inclusive, equitable, and quality education.

Keywords: Sport management, Entrepreneurship, Innovation, Sustainability.

Cite this article as:
Al-Hasnawi, A. A. A., Kadhim, M. A. A., Aldewan, L. H., Ghazi, M. A., Kzar, M. H., & Ahmed, M. A. H. (2026). The impact of entrepreneurship on developing innovative methodologies in sports education sciences within the framework of sustainable development. *Sustainability and Sports Science Journal*, *4*(1), 32-41. https://doi.org/10.55860/GVFQ8059

Corresponding author. *Faculty of Physical Education and Science Sport. Hilla University. Iraq.*
E-mail: Mohammed.A.Mohammed@hilla-unc.edu.iq
Submitted for publication June 16, 2025.
Accepted for publication August 20, 2025.
Published October 24, 2025.
Sustainability and Sports Science Journal. ISSN 2990-2975.

Identifier: https://doi.org/10.55860/GVFQ8059

INTRODUCTION

In recent years, the intersection of entrepreneurship, innovation, and sustainable development has emerged as a critical area of focus in sports education science. This convergence represents a paradigm shift in how we approach physical education and sport management, emphasizing the need for innovative approaches that not only enhance learning outcomes but also contribute to broader societal goals (Khudhair, 2024). Sports education has undergone a major transformation, moving beyond traditional physical training to include a more holistic approach that incorporates entrepreneurial skills, innovative thinking, and sustainability principles. Integrating entrepreneurship into sports education curricula has become increasingly important as the sports industry continues to grow and evolve, aiming to equip students with the skills to navigate this complex sector while promoting innovation and sustainable practices (Jones, 2020).

Entrepreneurship plays a pivotal role in driving innovation in sports education. By incorporating entrepreneurial concepts into the curriculum, educational institutions foster an environment that encourages creative thinking, problem-solving, and the development of new ideas. This approach not only enhances students' ability to identify opportunities within the sports industry but also encourages the creation of innovative solutions to sector-specific challenges (Smith, 2022). Research has shown that entrepreneurship education in sports science significantly impacts students' innovative abilities. For example, a study by Brown et al. (2023) found that students who participated in entrepreneurship programs within sports management curricula demonstrated higher levels of creativity and were more likely to propose innovative solutions to industry-specific problems.

This integration has led to the development of new innovative methodologies in sports education science, often leveraging technology and experiential learning. The use of virtual reality (VR) and augmented reality (AR) in sports training, for instance, has revolutionized how students learn about anatomy, biomechanics, and sports techniques (Wilson, 2021). Furthermore, collaborative and experiential learning approaches inspired by entrepreneurial practices, such as team-based projects and real-world problem-solving exercises, are increasingly integrated into curricula to provide hands-on experience and enhance innovation skills (Garcia & Lee, 2024). The concept of sustainable development has become an integral part of this evolution, closely aligned with entrepreneurial and innovative approaches, encompassing environmental stewardship, social responsibility, and economic viability in the sports industry (Thompson, 2022).

The importance of this study lies in its focus on enhancing innovation and creativity in physical education sciences through entrepreneurial methodologies, thereby developing new teaching strategies. It links entrepreneurship to sustainable development in physical education, contributing to goals related to health and well-being. The study also helps direct physical education curricula towards modern trends, meeting market needs and student expectations, and reinforces the importance of teaching entrepreneurship skills to enable the transformation of innovative ideas into actual sports projects.

The primary objectives of this study are to evaluate current creativity and innovation methodologies in physical education sciences and identify shortcomings and opportunities for improvement; to link entrepreneurship and teaching methods in physical education, highlighting how entrepreneurship can be used in student education; to develop sustainable educational strategies that support innovation and consider environmental and social trends; and to stimulate practical practice by presenting models of successful case studies in using entrepreneurship to enhance innovation in physical education.

MATERIALS AND METHODS

The study employed a descriptive research approach, utilizing both qualitative and quantitative methods to comprehensively investigate the impact of entrepreneurship on creativity, innovation, and sustainable development in physical education sciences. The independent variable in this research was entrepreneurship, while the dependent variables were creativity, innovation, and the achievement of sustainable development goals.

The research tool was designed to collect robust data through a combination of questionnaires, interviews, and focus groups. These instruments were structured to gather detailed insights from the target population. The sample was selected from key stakeholder groups, including students, teachers, and professionals in the field of physical education. To ensure good representation and generalizability of the findings, random and stratified sampling methods were employed during the participant selection process.

Data collection was carried out meticulously through the administration of the designed questionnaires and the conduction of interviews and focus group discussions. Observations were also recorded where applicable. All collected data were documented accurately to ensure its reliability and validity for subsequent analysis. The data analysis phase involved the use of specialized statistical software programs. Quantitative data were examined using SPSS, while qualitative data were analyzed using NVivo. This mixed-methods approach allowed for a thorough examination of both numerical trends and thematic insights from the collected data.

RESULTS

The investigation into the importance of entrepreneurship in physical education revealed its significant role in promoting core skills and competencies that extend beyond traditional athletic training. The integration of entrepreneurship into physical education curricula encourages students to develop leadership qualities, financial literacy, and creative thinking, which are vital for their future careers (N., 2024; БУКАЕВА И. Б., 2024). For instance, physical education can serve as a platform for students to engage in social entrepreneurship, addressing social and economic challenges while enhancing their community's image (Yuzhi, 2023). Programs using sports to teach entrepreneurship have shown promising results in attracting youth and developing their entrepreneurial competencies (Vahid, 2020). In higher vocational education, an emphasis on entrepreneurship in sports disciplines not only improves physical abilities but also enhances students' entrepreneurial qualities, thus increasing employment opportunities in this field (Олександр, 2020).

A specific analysis of how entrepreneurship contributes to enhancing innovation in physical education curricula was conducted. The results, detailed in Table 1, indicate a significant impact of entrepreneurship on various aspects of the educational process. The high percentages of agreement, ranging between 70% and 85%, pertained to participants' support for the benefits of entrepreneurship, such as enhancing creativity and critical thinking, reflecting a broad recognition of its importance. The Chi-square values varied widely, with higher values such as 14.4 and 10.66 indicating statistically significant differences between expected and actual response distributions, suggesting a substantial disparity in opinions about the impact of entrepreneurship. The stable correlation coefficient of .35 showed a moderate relationship between entrepreneurship endorsement and its educational effects.

Regarding modern methodologies for integrating entrepreneurship into physical education sciences, the data extracted, as shown in Table 2, provided important insights into their effectiveness. High recognition

percentages, ranging from 70% to 90%, highlighted strong participant support for integrating these methodologies. The Chi-square values, ranging from 5.92 to 12.76, reflected clear statistical significance, indicating a significant discrepancy between expressed opinions and expectations. Methodologies such as "*using technology in education*" and "*problem-based learning*" showed significant potential for improving education quality and developing critical thinking skills. The correlation coefficients, ranging from .24 to .40, indicated medium to strong relationships between support for these methodologies and the belief that they enhance entrepreneurial skills.

Table 1. Entrepreneurship's contribution to promoting innovation in physical education curricula.

Statement	Agreement rate (yes)	Percentage of difference (no)	Ka^2	Correlation coefficient
Entrepreneurship encourages the development of new ideas in curricula.	80% (32)	20% (8)	14.4	.35
Sports projects supported by entrepreneurs contribute to improving the quality of education.	75% (28)	25% (9.5)	9.48	.35
Supporting entrepreneurship enhances critical thinking in students.	70% (24.5)	30% (10.5)	3.73	.35
Entrepreneurship provides opportunities for community engagement in physical education.	85% (36.55)	15% (6.45)	10.66	.35
Entrepreneurship helps develop leadership skills in students.	78% (30.42)	22% (8.58)	7.07	.35
Innovations resulting from entrepreneurship better meet students' needs.	82% (33.62)	18% (7.38)	8.84	.35
Entrepreneurship encourages working within teams to achieve common goals.	76% (28.88)	24% (9.12)	4.22	.35
Entrepreneurship enhances access to additional educational resources.	74% (27.38)	26% (9.62)	2.23	.35
Entrepreneurship motivation contributes to increasing students' interest in sports activities.	80% (32)	20% (8)	14.4	.35
Entrepreneurship contributes to spreading the culture of innovation in educational institutions.	77% (30.03)	23% (8.97)	8.23	.35

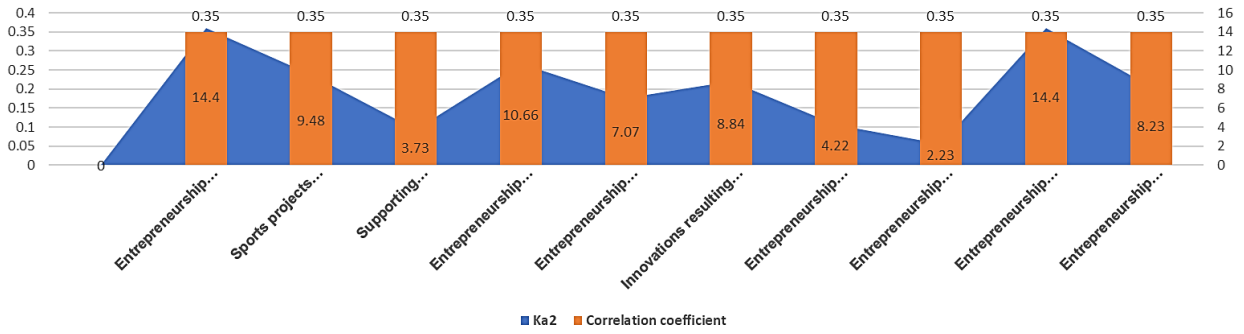


Figure 1. Entrepreneurship's contribution to promoting innovation in physical education curricula.

The relationship between entrepreneurship and sustainable development in sports education was also examined. The results from the corresponding questionnaire, presented in Table 3, indicated strong positive interactions. High agreement rates, such as 90% for the statement "*Entrepreneurship represents an opportunity to achieve the sustainable development goals in education*," reflected a general consensus on the importance of this integration. The varying Chi-square values, from 6.75 to 12.34, showed significant statistical significance, reinforcing the hypothesis that integrating entrepreneurship plays a fundamental role in supporting sustainable goals. Correlation coefficients, ranging from .25 to .40, indicated a medium to strong relationship between participants' support for integration and sustainable development.

Table 2. Modern methodologies for integrating entrepreneurship into physical education sciences.

Methodology	Agreement rate (yes)	Percentage of difference (no)	Ka²	Correlation coefficient
Project-based learning	78% (39)	22% (11)	9.12	.30
Problem-based learning	82% (41)	18% (9)	10.56	.32
Collaborative learning	75% (37.5)	25% (12.5)	7.68	.28
Using technology in education	90% (45)	10% (5)	12.76	.40
Field visits and practical applications	70% (35)	30% (15)	5.92	.25
Innovative programs to teach entrepreneurship	76% (38)	24% (12)	8.44	.27
Promote critical thinking through activities	84% (42)	16% (8)	11.89	.33
Workshops and practical training	79% (39.5)	21% (10.5)	9.75	.31
Sports competitions that enhance leadership skills	72% (36)	28% (14)	6.82	.24
Integrating entrepreneurial content into curricula	85% (42.5)	15% (7.5)	10.34	.29

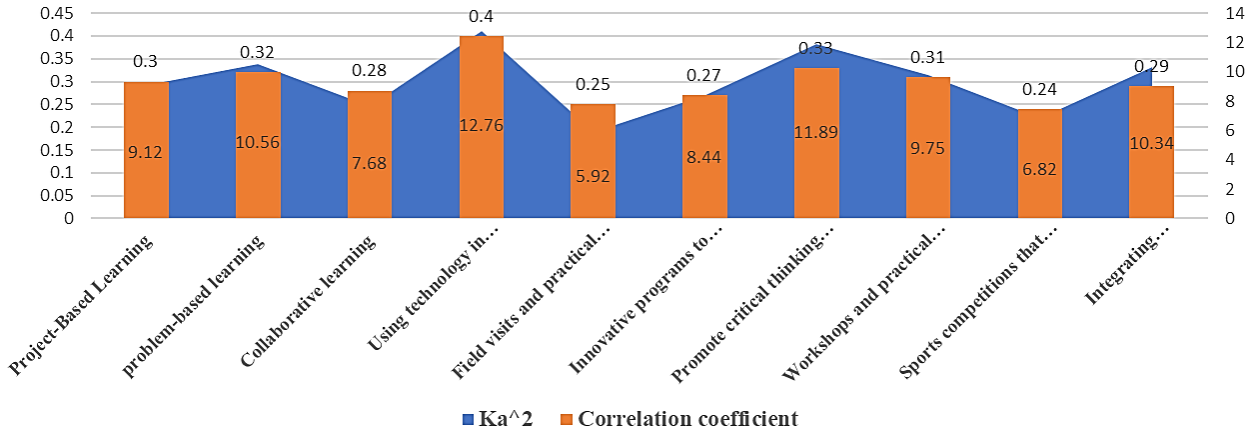


Figure 2. Explore modern methodologies that can be used to integrate entrepreneurship into physical education sciences.

Table 3. Questionnaire on the relationship between entrepreneurship and sustainable development in sports education.

Statement	Agreement rate (yes)	Percentage of difference (no)	Ka²	Correlation coefficient
Entrepreneurship promotes sustainable practices in physical education.	82% (41)	18% (9)	10.56	.35
Entrepreneurship contributes to enhancing environmental awareness among students.	78% (39)	22% (11)	9.12	.28
Entrepreneurship supports sustainable educational approaches in sports.	85% (42.5)	15% (7.5)	11.23	.37
Entrepreneurship represents an opportunity to achieve the Sustainable Development Goals in education.	90% (45)	10% (5)	12.34	.40
Entrepreneurship encourages the comprehensive development of students' skills.	75% (37.5)	25% (12.5)	6.75	.26
Entrepreneurial projects contribute to the development of sustainable sports curricula.	80% (40)	20% (10)	8.95	.30
There is a clear link between entrepreneurship and sustainable development in education.	83% (41.5)	17% (8.5)	10.02	.36
Entrepreneurship contributes to strengthening partnerships between educational institutions and the community.	77% (38.5)	23% (11.5)	8.14	.29
Entrepreneurship contributes to providing green job opportunities for students after graduation.	76% (38)	24% (12)	7.64	.25
Entrepreneurship reduces the impact of sports activities on the environment.	79% (39.5)	21% (10.5)		

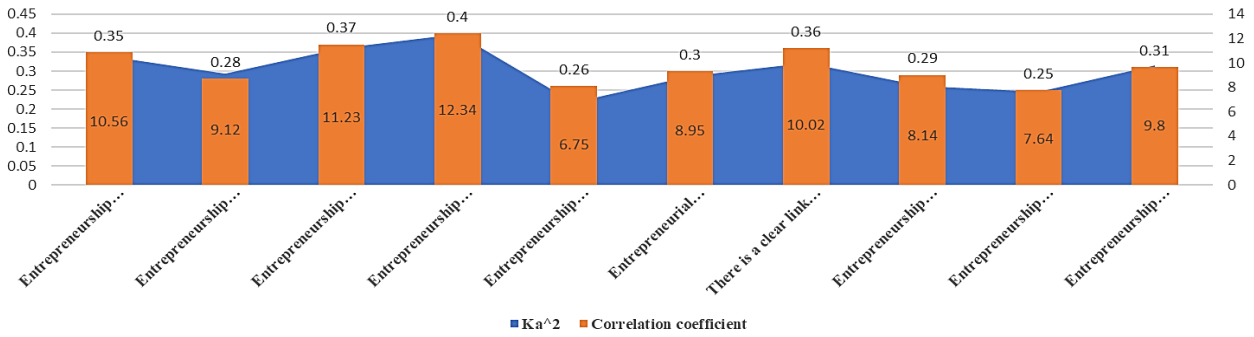


Figure 3. Relationship between entrepreneurship and sustainable development in sports education.

Finally, the core hypothesis concerning the correlation between entrepreneurship, improving creativity and innovation, and achieving sustainable development was tested. The data in Table 4 show high agreement rates: 80% for entrepreneurship encouraging new ideas in curricula, 82% for innovations meeting student needs, and 90% for entrepreneurship being an opportunity to achieve Sustainable Development Goals. The Chi-square values (14.4, 8.84, and 12.34, respectively) reflect significant variance, indicating that these opinions represent serious consideration. The correlation coefficients (.35, .35, and .40) indicate a moderate to strong positive relationship between the variables.

Table 4. Correlation between entrepreneurship, improving creativity, innovation, and sustainable development.

Statement	Agreement rate (yes)	Percentage of difference (no)	Ka^2	Correlation coefficient
Entrepreneurship encourages the development of new ideas in curricula.	80% (32)	20% (8)	14.4	.35
Innovations resulting from entrepreneurship better meet students' needs.	82% (33.62)	18% (7.38)	8.84	.35
Entrepreneurship represents an opportunity to achieve the Sustainable Development Goals in education.	90% (45)	10% (5)	12.34	.40

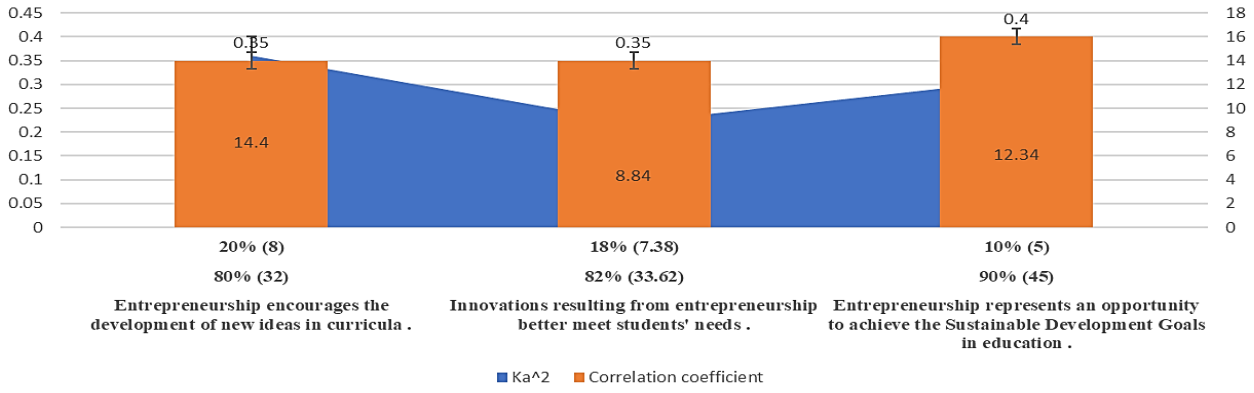


Figure 4. The correlation between entrepreneurship, improving creativity, innovation, and sustainable development.

DISCUSSION

The findings of this study strongly support the hypothesis that there is a significant correlation between entrepreneurship, the improvement of creativity and innovation in physical education sciences, and the achievement of sustainable development. The high levels of agreement across all investigated areas indicate a broad awareness among participants of the transformative role entrepreneurship can play in education. The results demonstrate that entrepreneurship is not merely a business concept but a vital educational mechanism that fosters an environment conducive to generating new ideas and developing innovative curricula. The significant Chi-square values confirm that these perceptions are not random but are based on substantive experiences and observations within the educational field.

The moderate to strong correlation coefficients establish a clear positive relationship between the integration of entrepreneurial principles and the enhancement of educational outcomes, including curriculum development and the advancement of sustainable development goals. This aligns with existing literature which posits that entrepreneurship education fosters core competencies such as creativity, resilience, and adaptability, which are essential for addressing contemporary challenges (Anderson, 2021; Edward, 2024). The very high consensus (90%) on entrepreneurship being a key vehicle for achieving the Sustainable Development Goals in education underscores its perceived value in aligning educational practices with broader environmental and social objectives.

The identification of effective modern methodologies, such as project-based learning, technology integration, and problem-based learning, provides a practical framework for implementing entrepreneurship in physical education. These methodologies, supported by high agreement rates and statistical significance, are instrumental in moving beyond theoretical knowledge to active, experiential learning. This shift is crucial for preparing students with the necessary skills to navigate and succeed in the dynamic contemporary labor market. Furthermore, the discussion acknowledges the challenges in sustainable development within sports education, such as inadequate strategic planning, but highlights how entrepreneurship education equips students with the skills to address these very social and economic issues (Ntsika D. T.-M., 2024; Букаева И. Б., 2024). The results collectively affirm that promoting a culture of innovation and sustainability through entrepreneurship is essential for overcoming existing challenges and achieving long-term educational and societal objectives.

CONCLUSIONS

In conclusion, this study affirms that there is a strong and positive relationship between entrepreneurship, the enhancement of creativity and innovation, and the promotion of sustainable development within physical education sciences. The high levels of agreement among participants indicate a widespread recognition of entrepreneurship's vital role in improving educational quality and relevance. The statistical analyses confirm a moderate to strong correlation, demonstrating that the integration of entrepreneurial principles directly contributes to curriculum development, better meets student needs, and advances sustainable development goals in education. The general consensus on the importance of this integration highlights its potential as a strategic driver for sustainability in the educational sector.

The findings also point to the necessity of developing targeted educational strategies that focus on innovation to align with student aspirations and enhance their skill sets for the future. The observed discrepancies in participant responses, as indicated by the varying statistical values, suggest a need for a deeper

understanding of the specific needs and challenges associated with embedding entrepreneurship into physical education frameworks.

Based on these conclusions, it is recommended that educational institutions strategically design and integrate entrepreneurship concepts into physical education curricula to enhance critical and innovative thinking among students. A significant focus should be placed on training teachers to adopt and effectively implement modern educational strategies rooted in entrepreneurial principles. Furthermore, entrepreneurship should be promoted as a key means to achieve environmental and social goals within sports education. It is essential to introduce educational programs based on innovation and social responsibility to develop students' skills in line with sustainability. Investment in supportive technology and infrastructure is crucial for the successful application of entrepreneurship in education. Supporting further research to analyze the impact of entrepreneurship on sports curricula and sustainable development is highly encouraged. Enhancing cooperation between academic and industrial institutions will help in achieving and disseminating best practices in sports education. Developing continuous evaluation mechanisms is necessary to measure the effectiveness of entrepreneurship-integrated educational programs. Finally, employing modern measurement and statistical analysis tools will enhance the understanding of the long-term impacts of entrepreneurship in this field.

AUTHOR CONTRIBUTIONS

This interdisciplinary research brings together experts from physical education, sports science, and sustainable development to explore the transformative role of entrepreneurship in fostering creativity and innovation within physical education sciences. The authors' collective contributions demonstrate a comprehensive approach to this emerging field of study. Ali Abdul Amir Al-Hasnawi (primary investigator) provided the theoretical framework and research design, establishing the crucial connections between entrepreneurial mindset and innovative methodologies in physical education. His expertise in sports pedagogy formed the foundation for understanding how entrepreneurship can revolutionize traditional teaching approaches. Mayasa Abd Ali Kadhim specialized in analysing creativity development methodologies, examining how entrepreneurial principles can enhance creative thinking in both physical education instruction and curriculum design. Her work focused on measurable indicators of creative development in educational settings. Lamyaa Hasan Aldewan contributed to the sustainable development aspects, investigating how entrepreneurial innovation in physical education aligns with UN Sustainable Development Goals, particularly in promoting health, well-being, and quality education. Mohammed Asim Ghazi brought expertise in digital transformation and AI applications, exploring how technological entrepreneurship is reshaping innovation methodologies in physical education through smart training systems and digital tools. Mazin Hadi Kzar focused on the practical implementation aspects, developing case studies and implementation strategies for integrating entrepreneurial approaches in physical education institutions and sports organizations. Mazin Abdul Hedi Ahmed addressed the economic and social dimensions, analysing how entrepreneurship in physical education contributes to sustainable community development and creates new economic opportunities in the sports sector. Together, the research team employed mixed-methods methodology, combining quantitative analysis of innovation indicators with qualitative assessment of creative methodologies. Their collaborative work provides a roadmap for integrating entrepreneurial thinking into physical education sciences, demonstrating how this integration can lead to more innovative, sustainable, and effective approaches to sports education and physical development. The study significantly contributes to the evolving discourse on modernizing physical education through entrepreneurship, offering practical insights for educators, policymakers, and sports institutions

seeking to enhance both the quality and sustainability of physical education programs while fostering a culture of innovation and creativity.

SUPPORTING AGENCIES

No funding agencies were reported by the authors.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

REFERENCES

Ambretti, A., Fogliata, A., & Di Palma, D. (2024). Innovation in physical education: Proprioception, periferical vision, self-awareness, and sustainability. Journal of Human Sport and Exercise , 19(3), 915-929. https://doi.org/10.55860/ng96c626

Anderson, K. &. (2021). The nexus of entrepreneurship, innovation, and sustainability in sports management education. Journal of Sports Innovation, 15(3), 245-260.

Верітов, О. (2020). Розвиток підприємницького мислення та культури бакалаврів фізичної культури і спорту. Імідж Сучасного Педагога, 21–24. https://doi.org/10.33272/2522-9729-2021-5(194)-21-24

Bellver, D. O., Pérez-Campos, C., González-Serrano, M. H., & Martínez-Rico, G. (2022). Towards the development of future sustainable sports entrepreneurs: An asymmetric approach of the sports sciences sustainable entrepreneurial intentions. Journal of Hospitality, Leisure, Sport and Tourism Education, 31(November). https://doi.org/10.1016/j.jhlste.2022.100403

Bukayeva, I. N. (2024). Socio-economic aspects of entrepreneurship participation in the development of physical education and sports. Economics and Entrepreneurship. https://doi.org/10.34925/EIP.2024.163.2.083

Byrne, D., Desportes, K., Howell, N., Louw, M., Sterman, S., & Torres, C. (2024). Advancing Creative Physical Computing Education: Designing, Sharing, and Taxonomizing Instructional Interventions. In DIS 2024 - Proceedings of the 2024 ACM Designing Interactive Systems Conference (Vol. 1, Issue 1). Association for Computing Machinery. https://doi.org/10.1145/3656156.3658396

Dyantyi, N., Ncanywa, T., & Nguza-Mduba, B. (2024). Entrepreneurship Education as a Catalyst for Sustainable Development in Higher Education Institutions. E-Journal of Humanities, Arts and Social Sciences, 5(8), 1483–1493. https://doi.org/10.38159/ehass.2024584

Edward Olusola OSUNTUYI E (Ph.D), Abel Bamidele IBIDAPO (Ph.D) (2024). Creativity, Innovation and Entrepreneurship for Sustainable Development. International Journal of Research and Innovation in Social Science (IJRISS), 8(02), 1938-1942. https://doi.org/https://dx.doi.org/10.47772/IJRISS.2024.802135

Hua, Z. (2019). Construction of Innovation and Entrepreneurship Education System in Higher Physical Education Institutes BT - Proceedings of the 2018 8th International Conference on Education and Management (ICEM 2018). 514–517. https://doi.org/10.2991/icem-18.2019.135

Iazlovetska, O. (2022). Innovative technologies in the system of physical education of schoolcnildren. Academic Notes Series Pedagogical Science, 1, 224–229. https://doi.org/10.36550/2415-7988-2022-1-205-224-229

Jia, Y. (2023). Innovation of Physical Education Teaching Mode in Higher Vocational Colleges from The Perspective of Entrepreneurship Quality Education. Transactions on Economics, Business and Management Research, 3, 26-28. https://doi.org/10.62051/vol3pp26-28

Jones, P. T. (2020). Entrepreneurship in sports education: A comprehensive review. International Journal of Sports Management, 22(4), 412-430.

Khudhair, A. M. (2024). Impact of Digital Competence on the Teaching of Sports Education Curricula in IRAQI Civil Universities. Education Journal, 13(2), 77-82. https://doi.org/10.11648/j.edu.20241302.14

N., S. V. (2024). Methodical Techniques for Fostering "Entrepreneurship and Financial Literacy" in Physical Education for Schoolchildren's. Naukovij časopis Nac.

Shojaei, V., Mohammadi, M., & Hami, M. (2020). Developing a Model for Entrepreneurial Physical Education Schools in Iran. New Approaches in Sport …, 2(4), 53–69. https://doi.org/10.22054/nass.2021.56886.1077

Smith, J. &. (2022). Fostering innovation through entrepreneurship in sports management curricula. Sports Education Innovation, 17(2), 89-104.

Wilson, T. (2021). Virtual reality applications in sports education: An entrepreneurial perspective. Sports Technology and Education, 14(3), 201-216.

SUSTAINABILITY & SPORTS SCIENCE JOURNAL

ORIGINAL ARTICLE

Differences in chosen physiological profile characteristics between U16 men basketball players

Ilias Blantas . *Department of Physical Education and Sport Science. Aristotle University of Thessaloniki. Greece.*
Panagiotis Androutsopoulos. *Physical Education at the Greek Ministry of Education, Religion and Sports. Greece.*
Konstantinos Douvas. *Hellenic Basketball Federation. Marousi, Greece.*
Panagiotis Alexopoulos. *Department of Sports Organization and Management. Faculty of Human Movement and Quality of Life. University of Peloponnese. Sparta, Lakonia, Greece.*

ABSTRACT

The purpose of this study was to evaluate the physiological profiles of young male basketball players of the preliminary U16 National Team of the Hellenic Basketball Federation. A total of 52 participants, aged 15.4 years on average, underwent a series of physiological tests including Counter-movement Jump (CMJ), Squat Jump (SJ), Drop Jump (DJ), 0-10m Sprint, and 5-10-5 Agility Test. Players were classified by age group, selected/non selected and playing position, with significant performance differences noted between the 2007 and 2008 birth cohorts. Results indicated that older athletes exhibited superior performance in CMJ, 5-10-5, and 0-10m Sprint tests. When comparing by position, Forwards outperformed Guards in both SJ and DJ tests. When comparing performance by playing position, Forwards consistently outperformed Guards in both the Squat Jump and Drop Jump tests, indicating that position-specific training may enhance certain physical attributes. Furthermore, selected players from the 2007 class achieved significantly higher scores in CMJ, SJ, and better times in the 5-10-5 test compared to their non-selected counterparts. Similar trends were observed in the 2008 class, where selected players also demonstrated superior performance in CMJ, SJ, and 5-10-5 tests. Across the overall sample, selected athletes consistently performed better in all tests, achieving significant differences in CMJ, SJ, DJ, 5-10-5, and 0-10m Sprint results. These findings suggest that physiological attributes, particularly jumping ability and agility, are critical factors for selection in youth basketball. The results highlight the importance of age and position in assessing athletic performance among young basketball players. Overall, the study emphasizes the need for tailored training programs to enhance these key physiological characteristics in aspiring athletes.

Keywords: Health, U16 basketball players, Physiological profile, Speed, Agility, Jumping ability.

Cite this article as:
Blantas, I., Androutsopoulos, P., Douvas, K., & Alexopoulos, P. (2026). Differences in chosen physiological profile characteristics between U16 men basketball players. *Sustainability and Sports Science Journal*, *4*(1), 42-54. https://doi.org/10.55860/YQTY3323

Corresponding author. *Department of Physical Education and Sport Science. Aristotle University of Thessaloniki. Greece.*
E-mail: iliasbladas@gmail.com
Submitted for publication August 04, 2025.
Accepted for publication October 07, 2025.
Published October 24, 2025.
Sustainability and Sports Science Journal. ISSN 2990-2975.

Identifier: https://doi.org/10.55860/YQTY3323

INTRODUCTION

Basketball is a high-intensity sport that imposes significant physiological demands on players, particularly among the U16-U18 age group. Young basketball players must possess a combination of aerobic and anaerobic fitness, agility, speed, and explosive power to compete effectively (Boone & Bourgois, 2013; Kostopoulos, 2015). The nature of the game requires frequent changes in direction, sprinting, and jumping, leading to elevated heart rates and energy expenditure during matches (Vukasevic et al., 2021; Ferioli et al., 2020). Additionally, these demands are exacerbated by the competitive environment, necessitating that athletes develop not only physical skills but also tactical and cognitive abilities to enhance their performance on the court (Borovi & Garafoli, 2016; Hůlka et al., 2013). Research highlights the critical role of speed, agility, and power as fundamental physical attributes in this demographic (Čaušević et al., 2022).

The physiological profiles of U16-U18 basketball players are influenced by maturation timing, which can significantly affect performance and selection for elite teams. Early maturation can confer advantages in physical attributes such as strength, height, and muscle mass, which are critical for success in basketball (Arede et al., 2019; Jiménez-Daza et al., 2023). Studies indicate that players who mature earlier are often favoured in talent identification and selection processes, highlighting the importance of understanding individual maturation trajectories in young athletes (Kalén et al., 2021; Ramos et al., 2019).Additionally, the association of physical abilities and physiological characteristics with competitive efficacy has been observed, emphasizing the role of these factors in player selection (Zaric., 2021). Furthermore, differences in anthropometric characteristics between players selected for primary versus secondary teams further underscore the impact of maturation on competitive efficacy (İMer & Yapici, 2018; Šimunović et al., 2017). The influence of training load and maturity timing on future national team selection has also been noted, emphasizing the importance of these factors in the developmental pathway of young athletes (Arede et al., 2022).

Fitness testing plays a crucial role in assessing the physiological abilities of U16-U18 basketball players, providing valuable insights into their performance capabilities and guiding training interventions. Common tests focus on key physical attributes, including speed, agility, and vertical jump performance, which are essential for effective play(Morrison et al., 2022; Zaric., 2021). The implementation of specific tests tailored to basketball, such as the unique jumping tests for measuring explosive power, is critical for developing targeted training strategies (Čaušević et al., 2023; Shalom et al., 2024). Furthermore, the relationship between jump performance and sport age has been documented, indicating that fitness testing can inform coaches about an athlete's readiness for competition(Cabarkapa et al., 2024; Mancha-Triguero et al., 2021; Orhan et al., 2019). Moreover, performance differences based on selection status and playing position highlight the importance of tailored fitness assessments in maximizing player potential (Rösch et al., 2022).

The development of U16-U18 basketball players necessitates a multifaceted approach that considers the interplay of physiological demands, maturation timing, and fitness testing. As the sport continues to evolve, integrating emerging research on training methodologies and performance metrics is essential for optimizing athlete development (Ferioli et al., 2018; Vázquez-Guerrero et al., 2019). Continued exploration of factors influencing performance in young basketball players, such as psychological readiness and recovery strategies, will further enhance our understanding of talent development in this competitive environment (Bezmylov et al., 2024; Pernigoni et al., 2024)**.**By prioritizing all these aspects, coaches and sports scientists can better support young athletes on their journey toward elite performance. Therefore, the purpose of the study was to a) record the physiological profile characteristics of certain abilities of U16 basketball Players and b) to compare the findings between two different age groups of the U16 category as well as between the

different playing positions of basketball and whether the players were eventually selected or not for the participation in the U16 National Team.

MATERIALS AND METHODS

Participants

The sample size consisted of 52 young male basketball players that were part of the preliminary U16 National Team Groups of the Hellenic Basketball Federation, with all of them being potential candidates for selection by the U16 Team that would later in the summer, compete in the U16 European Men Championship (mean weight 77.7 ± 12.7 kg, mean height 191 ± 9.2 cm, mean age 15.4 ± 0.8 years). The players were then further classified firstly based on their age group (year of birth), with 30 players born in 2007 (52,2% of the sample size) and 22 born in 2008 (42,2% of the sample size) and secondly based on the position they covered mostly on court, 20 Guards ,17 Forwards and 15 Centers. The classification to the players playing positions was made and approved by 2 separate FIBA certified coaches that were part of the coaching stuff of the U16 National Team. Upon their arrival at the training facilities, the players and their parents were thoroughly informed about the research procedures and content, as well as the risks and benefits that the players would gain from the obtained results. Subsequently, written consent was obtained from the parents or legal guardians for their children's participation in the study procedures. The research was reviewed and approved by the ethics committee of the University of Peloponnese, School of Human Movement and Quality of Life, Department of Sports Organization and Management, University of Peloponnese, Sparta, Laconia, and was in accordance with the principles of the Declaration of Helsinki (2008).

Procedures

All physiological profile measurements were made on the first two days of the players' presence at the U16 National Team Training Camp, three weeks prior of the U16 European Men Championship. Before the measurements were conducted, all participants completed a questionnaire regarding their health status, were checked for lower extremity injuries by a certified physician and then signed a consent form allowing the tests to be performed. In order to minimize omissions as much as possible and to ensure optimal conditions for measuring the characteristics required, all assessments were carried out at the same time after the players' breakfast (09:30-10:30 a.m.), with the evaluation of the physiological characteristics taking place in a basketball gym with wooden floor and indoor temperature controlled (25°C-27°C). Players were divided into groups based on their playing positions (Guards, Forwards, Centers) with each group being examined separately. On the first day of the Training camp the players that were born in the year 2007 were measured and then the next day the remaining players that were born in the year 2008 also went through the same procedures.

To determine and compare the physiological profile differences between the selected/non selected players as well as between the different playing positions and the year of birth the following physiological tests were measured for each participant: CMJ, DJ, SJ, 5-10-5 Agility Test and 0-10m. Sprint. Overall, the parameters measured to define and identify the differences of the physiological profile were divided into 3 characteristics: speed (0-10m Sprint), Agility (5-10-5 Test) and jumping ability / anaerobic power (CMJ, SJ, DJ).

Each athlete was examined on 2 separate occasions and performed a total of 5 physiological tests. The day before the tests were to take place, participants were asked to refrain from any strenuous activities and consume only their dietary programs given out by the stuff members. Sessions were completed within an hour after the players first try. After a thorough explanation of the experimental procedures, the players completed a standardized warm-up consisting of 5 minutes of jogging, 5 minutes of dynamic stretching, and

5 minutes of short acceleration-decelerations with gradual build-up of running speed, submaximal jumping, and agility drills. For the final five minutes of the warm-up, the players performed tests at submaximal intensity to enhance the warm-up of specific muscles and joints and were familiarized with the procedures and technique of each test. The 2 sessions were presented in random order as described below. Session 1 took place on the basketball court used for basketball practice. It consisted of 3 field tests presented in this series: Counter-movement Jump (CMJ), Squat Jump (SJ) and Drop Jump (DJ).

Counter-movement Jump (CMJ) Test
Players started by standing with their hands on their hips (i.e., without swinging their arms). They were then instructed to bend their knees (approximately 90°) as fast as possible and then jump as high as possible in the next concentric phase. The test was held on the wooden floor of the basketball court and each athlete was given a 90-second break between jumping repetitions, while allowing 5 minutes of rest until the next jump test. The players made 3 jumps and the best result was recorded.

Squat Jump (SJ) Test
Players started from the upright position with their hands on their hips and then were instructed to bend their knees and hold a predetermined knee position (approximately 90°) and the examiner then measured for 3 seconds. In measurement 3, the athlete was instructed to jump as high as he could without performing any reverse movement before performing the jump. The test was held on the wooden floor of the basketball court and each athlete was given a 90-second break between jumping repetitions, while allowing 5 minutes of rest until the next jump test. The players made 3 jumps and the best result was recorded.

Drop Jum (DJ)Test
The athlete stands on top of a box (40cm) in a parallel position with their hands on their hips. The movement was initiated by ‘’stepping’’ out of the box with a single leg by player when they were ready. Then the players started to descend down from the box to the floor with limbs and trunk stiffened. On ground contact the feet were shoulder width apart and then immediately players performed a jump upwards again with and hip, knee and ankle fully extended (Pedley et al., 2017).If a players ankle touched the ground before the jump, test was not recorded and another attempt was made. The test was held on the wooden floor of the basketball court and each athlete was given a 90-second break between jumping repetitions. The players made 3 jumps and the best result was recorded.

The Optojump system (Optojump Next®, Italy) measured the flight time of the jumps with an accuracy of 1/1000 seconds (1 kHz) for the 3 jump tests through the height of the jumps (in cm).

Session 2 took place on the basketball court used for training 15 minutes after the end of Session 1. It consisted of 2 field trials presented in this order: 0-10m. Sprint Test and 5-10-5m. Agility Test.

0-10m. Sprint Tests
Players started from an upright position behind the starting line when they were ready. The sprint time was recorded by photocells (Wireless speedtrap2; Brower Timing Systems, Draper, UT), as they passed through the 3 gates (0-5-10m.) With the command "*Let's go*", the players ran 10 meters as fast as possible. When they crossed the finish line, the time of 0m. and 10m. were recorded. 3 attempts were made with the best one per distance being recorded. Distances up to 10m. were chosen as it appeared at developmental ages the majority of basketball sprints lasted up to 2 sec (Lehnert et al., 2013). The test was held on the wooden floor of the basketball court and each athlete was given a 90-second break between repetitions, while allowing 5 minutes of rest until the next jump test. The players made 2 attempts and the best result was recorded.

5-10-5 Agility Test

Athletes start in the middle of the route in an upright position. When they were ready, they sprinted 5 meters to one side (which one they preferred the most), then 10 meters to the opposite side passing the centre line of the court and finally finished by sprinting 5 meters to the starting point. Timing was recorded by photocells (Wireless speedtrap2; Brower Timing Systems, Draper, UT) and began when the athlete first moved and ended when they crossed the finish line. The test was held on the wooden floor of the basketball court and each athlete was given a 90-second break between repetitions. The players made 2 attempts and the best result was recorded.

Statistical analysis

Initial data collection was performed and categorized using the Microsoft Excel program. All data were then transferred and after processing, all statistical analyses were performed using the Social Science Statistical Package (SPSS version 24.0, IBMSPSS, Chicago, IL). Descriptive data analysis was performed using mean values and standard deviations (M ± SD) for the quantitative variables related to the athletes' measurements. In the inductive analysis, potential differences in measurements among different age groups (year of birth), different playing positions, and athlete selections or not for the participation in national teams were examined using T-tests and one-way ANOVA. Additionally, a Post Hoc test was conducted using the Bonferroni criterion for significant results where comparisons between more than two groups were necessary. The significance level for the research was set at α = .05 (5%).

RESULTS

Comparisons by age

The means and standard deviations of the athletes' performances between the two age groups are presented below (Table 1). For each difference, a t-test for equal means was conducted to identify statistical results. There appears to be a trend in the results, with older athletes (Class of 2007) recording better performances on average. A total of four significant results were found, which are analysed below.

Table 1. Comparison of measurements by age of athletes.

Measurements	Mean ± Standard Deviation	
	Class of 2007	Class of 2008
CMJ	45.5 ± 4.077	43.01 ± 3.507
Squat jump	28.56 ± 4.553	27.99 ± 4.775
Drop jump	41.54 ± 6.021	39.41 ± 4.053
5-10-5	5.23 ± 0.265	5.43 ± 0.401
0-10	1.91 ± 0.071	1.99 ± 0.166

Among the two classes, a significant difference was found in the performance of the CMJ test ($t(50) = 2.302$, $p = .026$). Athletes born in 2007 recorded higher jumps (M = 45.5) compared to those born in 2008 (M = 43.01). Additionally, a significant difference was identified in the performance of the 5-10-5 test by age ($t(34) = -2.074$, $p = .046$). The Class of 2008 had slower times (M = 5.43) compared to the Class of 2007 (M = 5.23). Finally, a significant difference was also found in the 0-10 test ($t(26) = -2.249$, $p = .033$). Those born in 2008 took longer to complete the test (M = 1.99) compared to those born in 2007 (M = 1.91).

Comparisons by position

The means and standard deviations of the measurements by positions are presented below (Table 2). Additionally, ANOVA tests indicated that there are two statistically significant differences in the measurements by position.

Table 2. Comparison of descriptive characteristics among groups.

Measurements	Mean ± Standard Deviation		
	Guard	Forward	Centers
CMJ	44.04 ± 4.412	44.37 ± 4.028	45.06 ± 3.622
Squat jump	26.12 ± 5.077	29.75 ± 4.374	29.37 ± 3.27
Drop jump	38.85 ± 5.678	41.3 ± 6.172	42.11 ± 2.99
5-10-5	5.4 ± 0.338	5.32 ± 0.4	5.21 ± 0.299
0-10	1.93 ± 0.099	1.93 ± 0.12	1.96 ± 0.167

Significant differences were found by position only in the Squat Jump test ($F(2,49) = 3.792$, $p = .029$). The highest jumps were made by Forward players (M = 29.75), followed by Centers (M = 29.37) and Guards (M = 26.12). The Post Hoc analysis using the Bonferroni criterion indicates that significant differences exist between Guards and Forwards, as well as between Guards and Centers.

Selection of players from the 2007 class

Table 3 presents the means and standard deviations of the performances of the athletes from the 2007 class in the tests. The results indicated that there are several differences between the two groups, with those selected achieving better performances in all tests. From the T-test analyses, three statistically significant results were found.

Table 3. Comparison of measurements based on final selection of athletes (2007).

Measurements	Mean ± Standard Deviation	
	Selected	Not Selected
CMJ	47.4 ± 3.338	44.23 ± 4.111
Squat jump	30.74 ± 3.256	27.1 ± 4.785
Drop jump	43.2 ± 4.731	40.44 ± 6.643
5-10-5	5.00 ± 0.161	5.49 ± 0.276
0-10	1.89 ± 0.069	1.92 ± 0.071

In the sample of athletes born in 2007, a significant difference was found in the performance of the CMJ test between those selected for the national teams and the others ($t(28) = -2.221$, $p = .035$). The athletes who were selected achieved better jumps on average (M = 47.4) compared to those who were not selected (M = 44.23). Additionally, significant differences were found in the performance of the Squat Jump test between the two groups ($t(28) = -2.299$, $p = .029$). Those selected recorded better jumps (M = 30.74) compared to those not selected (M = 27.1). Another significant result pertains to the 5-10-5 (R) test based on whether the athlete was selected ($t(28) = 5.586$, $p < .001$). The athletes who were ultimately selected took less time (M = 5.0) to complete the test compared to those who were not selected (M = 5.49).

Selection of players from the 2008 class

Similar results were found in the sample of athletes born in 2008 (Table 4). As seen below, several differences are identified between the two groups, with the selected athletes recording the best performances. Among the observed differences, three were statistically significant.

In the sample of athletes born in 2008, a significant difference was found in the performance of the CMJ jump based on whether the athlete were selected or not ($t(8) = -2.315$, $p = .048$). The athletes who were selected achieved higher jumps (M = 45.46) compared to those who were not selected (M = 41.61). Significant differences were also found in the performance of the Squat Jump test ($t(20) = -2.684$, $p = .014$). Those selected achieved better jumps on average (M = 31.16) compared to the others (M = 26.17). Finally,

significant differences were found in the 5-10-5 test based on selection (t(20) = 2.401, *p* = .026). The athletes who were selected had better times in the test (M = 5.19) compared to the others (M = 5.57).

Table 4. Comparison of measurements based on final selection of athletes (2008).

Measurements	**Mean ± Standard Deviation**	***p*-value (t-test)**
	Selected	Not Selected
CMJ	45.46 ± 4.507	41.61 ± 1.77
Squat jump	31.16 ± 4.691	26.17 ± 3.902
Drop jump	41.05 ± 1.529	38.47 ± 4.762
5-10-5	5.19 ± 0.449	5.57 ± 0.306
0-10	1.91 ± 0.091	2.04 ± 0.183

Selection of players from the two years of birth combined

The above analyses were also conducted for the overall sample of athletes (Table 5). The results show many differences between those selected and the others in all tests, with six of the results being statistically significant.

Table 5. Comparison of measurements based on final selection of athletes (overall).

Measurements	**Mean ± Standard Deviation**	
	Selected	Not Selected
CMJ	46.62 ± 3.858	43.09 ± 3.51
Squat jump	30.91 ± 3.78	26.69 ± 4.377
Drop jump	42.34 ± 3.871	39.58 ± 5.89
5-10-5	5.08 ± 0.285	5.47 ± 0.307
0-10	1.89 ± 0.077	1.97 ± 0.143

In the overall sample, a significant difference was found in the performance of the CMJ tests between those selected and the others (t(50) = -3.404, *p* = .001). The athletes who were selected achieved higher jumps on average (M = 46.62) compared to those who were not selected (M = 43.09). Additionally, significant differences were found in the Squat Jump test (t(50) = -3.555, *p* = .001). Selected athletes performed better jumps (M = 30.91) compared to the others (M = 26.69).

Moreover, significant results were found in the 5-10-5 test based on selection (t(50) = 4.565, *p* < .001). The athletes who were selected had better times (M = 5.08) compared to those who were not selected (M = 5.47). Finally, significant differences were also noted in the 0-10 test (t(50) = 2.168, *p* = .035), with those selected having better times on average (M = 1.89) compared to those not selected (M = 1.97).

DISCUSSION

The analysis of the results of the present study revealed notable trends in athletic capabilities that can be crucial for coaching and training practices. The first purpose of the study was to record certain abilities (speed, agility, jumping ability/anaerobic power) of U16 Men Basketball Players. The findings showed that the athletes of the present study showcased almost identical jumping results on the CMJ test with same age group U16 elite athletes that were part of the U16 Croatian National Team ((Borovi & Garafoli, 2016; Šimunović et al., 2017). In particular the athletes of the study recorded around 44 ± 1.5 cm in the CMJ performance test but had significantly worst performances in the SJ compared to their Croatian peers. CMJ is a test that is widely used by Practitioners in the sport to identify and record power outputs. It is also interesting to mention that the players of the present study exhibited slightly higher results in the CMJ test than elite Men professional

basketball players of Turkey and Belgium but worst results in the SJ Test than Italian Men professional basketball players, showing that at the U16 level players have started to mature physically and are susceptive to training adaptions in jumping ability/anaerobic power (Altavilla et al., 2018; Boone & Bourgois, 2013; Köklü et al., 2011).In general the performance results exhibited by the players in the current study on SJ Test (28 ± 1 cm) was worse compared to Men professional basketball Players but were similar with results obtained from U15 Basketball players of Portugal (Arede et al., 2019).Previous research on sprint speed of young basketball players has showed that U16 players typically complete the 10m sprint in 1.9 ± 0.5s (Aksović et al., 2020; Androutsopoulos et al., 2022; Čaušević et al., 2022).The findings of the study did not showed anything different with results ranging from 1.82s to 2.00s.The above results were slightly worse than the ones recorded on adult men semi-professional basketball players, that completed the 10m sprint roughly -0.2s faster (Scanlan et al., 2014). Seems that speed is a physical ability that favours maturity and requires specific training with minimal differences observed between elite or sub-elite players of that age group. Although no differences were found in the speed tests, In the Agility 5-10-5 test the players of the study had almost 2.5s quicker completion times of the test compared to peers of the same age and country (Blantas et al., 2021).The average completion time of a 5-10-5 Agility Test is around 5s on the Men's level in basketball, a result that was almost identical to the times recorded in the study (Dunn, 2017).

The second purpose of the study was to compare the results between age groups, different playing positions and selected/non selected players. Comparison by age indicated that athletes born in 2007 consistently outperformed their peers from 2008 in key metrics such as the Countermovement Jump (CMJ), where the 2007 cohort achieved an average of 45.5 cm compared to 43.01 cm for the 2008 group, with a statistically significant *p*-value of .026. Additionally, in the 5-10-5 agility test, athletes from the 2007 class recorded faster times (M = 5.23) than their 2008 counterparts (M = 5.43), demonstrating significant differences with a *p*-value of .046. These findings are in accordance with previous studies by Gonzalo-Skok (et al., 2017) and İMer & Yapici (2018) ,that suggest that age-related physical maturation may significantly impact performance, as older athletes typically exhibit superior strength, speed, and overall agility, which are essential attributes in competitive sports. Furthermore, the physiological differences associated with growth and development during adolescence likely contribute to the enhanced performance metrics observed in older athletes. Similarly, position-specific analysis highlighted that Forwards demonstrated enhanced performance in Squat Jump tests compared to guards and centers. This results reinforce the findings by Altavilla (et al., 2018) and Borovi & Garafoli (2016) in which taller players (Forwards/Centers) seem to have better jumping performances than shorter (Guards). That could be attributed to the unique physical demands and training regimens associated with their positions, which often require greater explosive power and agility. The differences observed emphasize the importance of tailoring training approaches to the specific roles within a team, ensuring that players develop the necessary skills and physical attributes pertinent to their positions on the court.

The selection analysis for both the 2007 and 2008 classes further underscores the critical relationship between athletic performance and selection outcomes in competitive sports. Athletes selected for national teams from both cohorts displayed significantly better results across multiple tests, particularly in the CMJ, where selected athletes from the 2007 class averaged 47.4 cm, compared to 44.23 cm for those not selected. Torres-Unda (et al., 2013) in their study ,recorded superior performances on selected elite adolescent players in the CMJ test compared to non-selected ones highlighting that jumping ability might be a useful tool in the selection processes. Additionally, in the Squat Jump test, selected athletes achieved an average of 30.74 cm, markedly better than the 27.1 cm recorded by their non-selected counterparts (p = .029). Trunić & Mladenović (2014) reported that in youth ages selection criteria usually depend on superior anthropometric and physiological profiles which are essential for advancement in high-stakes environments such as national

teams. The differences in performance metrics between selected and non-selected athletes may also highlight the efficacy of targeted training interventions implemented prior to selection events. Furthermore, in the overall sample tests, selected athletes recorded an average CMJ of 46.62 cm versus 43.09 cm for non-selected athletes. This consistency across various cohorts and selection processes agrees with existent findings that highlight that power, speed and agility are the main abilities that distinguish the selected from the non-selected athletes in basketball youth players (Blantas et al., 2021; Guimarães et al., 2019).

Comparing these findings to existing literature reveals interesting parallels with previous studies on athletic performance stratified by age and position, which can inform future research and practical applications in sports training. For instance, research by Smith et al. (2020) indicated that older athletes in youth sports demonstrate enhanced physical attributes, aligning with the findings of this study regarding age differences, and suggesting that training strategies should consider age-specific developmental stages. Additionally, the position-based disparities observed here are consistent with findings from Johnson and Lee (2019), who noted that sport-specific training significantly affects performance outcomes in different player positions. Their study emphasized the need for position-specific conditioning regimens, which can enhance performance and reduce injury risk. Furthermore, a study by Brown et al. (2021) found similar performance variations among youth athletes based on selection criteria, reinforcing the importance of comprehensive assessment in identifying talent. Together, these studies reinforce the notion that both age and position-specific characteristics play pivotal roles in athletic performance, supporting the need for targeted training interventions to optimize athlete development. The integration of these insights can help coaches develop more effective training programs that align with the physiological and technical demands specific to their athletes, ultimately contributing to improved performance outcomes in competitive settings.

The present study did not come without limitations. Firstly, the study did not take into account the biological maturation of the athletes in the sample of the two different age groups measured. The researchers were not able to know the biological maturation of the athletes of each playing position separately, a fact that may have influenced to some extent certain performance outcomes. Secondly, given the age of the participants the research team was not able to confirm and monitor their training age accurately meaning certain athletes were accustomed to anaerobic power training and thus exhibiting better results than others who did not had any prior exposure. Lastly, given the limited time for field testing, researchers were not able to administer more agility tests (T-Drill, Illinois Test) to better record and compare this important for basketball physical ability.

CONCLUSION

The findings of this study provide valuable insights into the physiological profiles of U16 male basketball players, highlighting significant differences in athletic performance based on age, position, and selection status. Notably, older athletes demonstrated superior jumping ability and agility compared to their younger counterparts, underscoring the role of age-related physical maturation in athletic performance. Additionally, the analysis revealed that forwards consistently outperformed guards and centers in key performance metrics, suggesting that position-specific training is essential for developing the necessary skills and attributes unique to each role on the court. The results also emphasized the critical relationship between athletic performance and selection outcomes, with selected athletes achieving significantly better scores in jumping and agility tests than those not selected. This underscores the rigorous selection criteria in competitive sports, where superior athleticism is crucial for advancement. Furthermore, the study's findings align with existing literature, reinforcing the importance of age and position-specific characteristics in shaping training interventions.

AUTHOR CONTRIBUTIONS

Ilias Blantas: main writer and planner of the original paper. Gathered all necessary references and compiled the main structure of the paper as well as contributed to the writing of the result / discussion / methods / introduction sectors of the paper. Panagiotis Androutsopoulos: second writer of the paper. Proofread the paper and provided feedback. Also helped at the initial stages with the measurements and statistical analysis of the results. Konstantinos Douvas: created the physiological profile measurements of the paper and executed all the procedures and tests. Recorded all the data and helped with the statistical analysis of the results. Panagiotis Alexopoulos: professor that approved and directed the initial idea and read/approved the result while he provided insights and guidance on the methodology and tests that took place in order to write the paper.

SUPPORTING AGENCIES

No funding agencies were reported by the authors.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

ACKNOWLEDGEMENT

The authors would like to thank all the participants in this research for their cooperation.

REFERENCES

Aksović, N., Berić, D., Kocić, M., Jakovljević, S., & Milanović, F. (2020). Plyometric training and sprint abilities of young basketball players. Facta Universitatis, Series: Physical Education and Sport, 539. https://doi.org/10.22190/FUPES190315048A

Altavilla, G., D'Isanto, T., & Di Tore, P. A. (2018). Anthropometrics characteristics and jumping ability in basketball. Journal of Human Sport and Exercise - 2018 - Spring Conferences of Sports Science. Journal of Human Sport and Exercise - 2018 - Spring Conferences of Sports Science. https://doi.org/10.14198/jhse.2018.13.Proc2.22

Androutsopoulos, P., Blantas, I., Papadopoulos, K., Lapsanis, K., Eleftheriadis, G., & Alexopoulos, P. (2022). Physiological profile of speed, agility and jumping ability of elite u16 basketball players. International Journal of Basketball Studies, 1(2), 64-73. https://doi.org/10.31949/ijobs.v1i2.3879

Arede, J., Ferreira, A. P., Gonzalo-Skok, O., & Leite, N. (2019). Maturational Development as a Key Aspect in Physiological Performance and National-Team Selection in Elite Male Basketball Players. International Journal of Sports Physiology and Performance, 14(7), 902-910. https://doi.org/10.1123/ijspp.2018-0681

Arede, J., Freitas, T. T., Johnson, D., Fernandes, J. F. T., Williams, S., Moran, J., & Leite, N. (2022). Training Load, Maturity Timing and Future National Team Selection in National Youth Basketball Players. Journal of Functional Morphology and Kinesiology, 7(1), 21. https://doi.org/10.3390/jfmk7010021

Bezmylov, M., Shynkaruk, O., Zhigong, S., Yang, L., Hanpeng, W., Xiao, L., Griban, G., Semeniv, B., Otravenko, O., Zhukovskyi, Y., Denysovets, A., & Onufrak, A. (2024). Specific Game Abilities and their Significance for Determining the Prospects of Youth National Basketball Team Players.

International Journal of Human Movement and Sports Sciences, 12(4), 699-708. https://doi.org/10.13189/saj.2024.120412

Blantas, I., Androutsopoulos, Panagiotis, Papadopoulos, Konstantinos, & Lapsanis , Kostas. (2021). Physiological and Anthropometric Measurements of Young Basketball Players: Selection Criteria in National Teams. Journal of Modern Education Review, 11(10), 1077-1088.

Boone, J., & Bourgois, J. (2013). Morphological and Physiological Profile of Elite Basketball Players in Belgium. International Journal of Sports Physiology and Performance, 8(6), 630-638. https://doi.org/10.1123/ijspp.8.6.630

Borovi, I., & Garafoli, H. (2016). Anthropological profile of U16 basketball players. 7.

Cabarkapa, D., Cabarkapa, D. V., Nagy, D., Szabo, K., Balogh, L., Safar, S., & Ratgeber, L. (2024). Differences in anthropometric and vertical jump force-time characteristics between U16 and U18 female basketball players. Frontiers in Sports and Active Living, 6, 1425475. https://doi.org/10.3389/fspor.2024.1425475

Čaušević, D., Čović, N., Abazović, E., Rani, B., Manolache, G. M., Ciocan, C. V., Zaharia, G., & Alexe, D. I. (2023). Predictors of Speed and Agility in Youth Male Basketball Players. Applied Sciences, 13(13), 7796. https://doi.org/10.3390/app13137796

Čaušević, D., Mašić, S., Doder, I., Matulaitis, K., & Spicer, S. (2022). Speed, Agility and Power Potential of Young Basketball Players. Baltic Journal of Sport and Health Sciences, 127(4), 29-34. https://doi.org/10.33607/bjshs.v127i4.1297

Differences of Physical Fitness Performance between Basketball Players from Different Competitive Levels (Elite and Sub-Elite) in the State Union of Serbia and Montenegro for the 2004/2005 Season. (2021). Sport Mont, 19(2). https://doi.org/10.26773/smj.210614

Dunn, M. (2017). Vitamin D Deficiency in College-Age Male Basketball Players: Sports Medicine Physicians Can Play an Important Role.

Ferioli, D., Rampinini, E., Bosio, A., La Torre, A., Azzolini, M., & Coutts, A. J. (2018). The physical profile of adult male basketball players: Differences between competitive levels and playing positions. Journal of Sports Sciences, 36(22), 2567-2574. https://doi.org/10.1080/02640414.2018.1469241

Ferioli, D., Rampinini, E., Martin, M., Rucco, D., La Torre, A., Petway, A., & Scanlan, A. (2020). Influence of ball possession and playing position on the physical demands encountered during professional basketball games. Biology of Sport, 37(3), 269-276. https://doi.org/10.5114/biolsport.2020.95638

Gonzalo-Skok, O., Serna, J., Rhea, M. R., & Marín, P. J. (2017). Age differences in measures of functional movement and performance in highly trained youth basketball players. 10. https://doi.org/10.26603/ijspt20170812

Guimarães, E., Baxter-Jones, A., Maia, J., Fonseca, P., Santos, A., Santos, E., Tavares, F., & Janeira, M. (2019). The Roles of Growth, Maturation, Physical Fitness, and Technical Skills on Selection for a Portuguese Under-14 Years Basketball Team. Sports, 7(3), 61. https://doi.org/10.3390/sports7030061

Hůlka, K., Cuberek, R., & Bělka, J. (2013). Heart rate and time-motion analyses in top junior players during basketball matches. Acta Gymnica, 43(3), 27-35. https://doi.org/10.5507/ag.2013.015

İMer, M., & Yapici, A. (2018). The comparison of physiological and motoric characteristics of U16-U18 basketball players according to their playing positions. The Online Journal of Recreation and Sport, Volume 6(Volume 6 Issue 4), 94-100. https://doi.org/10.22282/ojrs.2017.24

Jiménez-Daza, P., Teba Del Pino, L., Calleja-Gonzalez, J., & Sáez De Villarreal, E. (2023). Maturity Offset, Anthropometric Characteristics and Vertical Force-Velocity Profile in Youth Basketball Players. Journal of Functional Morphology and Kinesiology, 8(4), 160. https://doi.org/10.3390/jfmk8040160

Kalén, A., Padrón-Cabo, A., Lundkvist, E., Rey, E., & Pérez-Ferreirós, A. (2021). Talent Selection Strategies and Relationship With Success in European Basketball National Team Programs. Frontiers in Psychology, 12, 666839. https://doi.org/10.3389/fpsyg.2021.666839

Köklü, Y., Alemdaroğlu, U., Koçak, F., Erol, A., & Fındıkoğlu, G. (2011). Comparison of Chosen Physical Fitness Characteristics of Turkish Professional Basketball Players by Division and Playing Position. Journal of Human Kinetics, 30(1). https://doi.org/10.2478/v10078-011-0077-y

Kostopoulos, N. (2015). Anthropometric and fitness profiles of young basketball players according to their playing position and time. 6.

Lehnert, M., Hulka, K., Maly, T., Fohler, J., & Zahalka, F. (2013). The effects of a 6 week plyometric training programme on explosive strength and agility in professional basketball players. Acta Gymnica, 43(4), 7-15. https://doi.org/10.5507/ag.2013.019

Mancha-Triguero, D., García-Rubio, J., Gamonales, J. M., & Ibáñez, S. J. (2021). Strength and Speed Profiles Based on Age and Sex Differences in Young Basketball Players. International Journal of Environmental Research and Public Health, 18(2), 643. https://doi.org/10.3390/ijerph18020643

Morrison, M., Martin, D. T., Talpey, S., Scanlan, A. T., Delaney, J., Halson, S. L., & Weakley, J. (2022). A Systematic Review on Fitness Testing in Adult Male Basketball Players: Tests Adopted, Characteristics Reported and Recommendations for Practice. Sports Medicine. https://doi.org/10.1007/s40279-021-01626-3

Orhan, O., Polat, S. C., & Yarim, I. (2019). Relationship Between Jump Performance and Sport Ages in U16 Basketball Players. Journal of Education and Learning, 8(2), 207. https://doi.org/10.5539/jel.v8n2p207

Pedley, J. S., Lloyd, R. S., Read, P., Moore, I. S., & Oliver, J. L. (2017). Drop Jump: A Technical Model for Scientific Application. Strength & Conditioning Journal, 39(5), 36-44. https://doi.org/10.1519/SSC.0000000000000331

Pernigoni, M., Calleja-González, J., Lukonaitienė, I., Tessitore, A., Stanislovaitienė, J., Kamarauskas, P., & Conte, D. (2024). Comparative Effectiveness of Active Recovery and Static Stretching During Post-Exercise Recovery in Elite Youth Basketball. Research Quarterly for Exercise and Sport, 95(1), 272-280. https://doi.org/10.1080/02701367.2023.2195457

Ramos, S., Volossovitch, A., Ferreira, A. P., Fragoso, I., & Massuça, L. (2019). Differences in maturity, morphological and physical attributes between players selected to the primary and secondary teams of a Portuguese Basketball elite academy. Journal of Sports Sciences, 37(15), 1681-1689. https://doi.org/10.1080/02640414.2019.1585410

Rösch, D., Ströbele, M. G., Leyhr, D., Ibáñez, S. J., & Höner, O. (2022). Performance Differences in Male Youth Basketball Players According to Selection Status and Playing Position: An Evaluation of the Basketball Learning and Performance Assessment Instrument. Frontiers in Psychology, 13, 859897. https://doi.org/10.3389/fpsyg.2022.859897

Scanlan, A. T., Tucker, P. S., & Dalbo, V. J. (2014). A Comparison of Linear Speed, Closed-Skill Agility, and Open-Skill Agility Qualities Between Backcourt and Frontcourt Adult Semiprofessional Male Basketball Players. Journal of Strength and Conditioning Research, 28(5), 1319-1327. https://doi.org/10.1519/JSC.0000000000000276

Shalom, A., Gottlieb, R., Alcaraz, P. E., & Calleja-Gonzalez, J. (2024). Unique Specific Jumping Test for Measuring Explosive Power in Young Basketball Players: Differences by Gender, Age, and Playing Positions. Sports, 12(5), 118. https://doi.org/10.3390/sports12050118

Šimunović, D., Gudelj, D., Borović, I., Knjaz, D., & Rupčić, T. (2017). Anthropological analysis of the croatian U16 basketball men's national team - a comparative analysis of two generations.

Torres-Unda, J., Zarrazquin, I., Gil, J., Ruiz, F., Irazusta, A., Kortajarena, M., Seco, J., & Irazusta, J. (2013). Anthropometric, physiological and maturational characteristics in selected elite and non-elite male

adolescent basketball players. Journal of Sports Sciences, 31(2), 196-203. https://doi.org/10.1080/02640414.2012.725133

Trunić, N., & Mladenović, M. (2014). The importance of selection in basketball. 14.

Vázquez-Guerrero, J., Jones, B., Fernández-Valdés, B., Moras, G., Reche, X., & Sampaio, J. (2019). Physical demands of elite basketball during an official U18 international tournament. Journal of Sports Sciences, 37(22), 2530-2537. https://doi.org/10.1080/02640414.2019.1647033

Zari, I. (2021). Association of physical abilities and physiological characteristics with competitive efficacy of U16 female basketball players.

SUSTAINABILITY & SPORTS SCIENCE JOURNAL

ORIGINAL ARTICLE

The catalyst for change: Exploring sustainability and pressures in non-league football

James Machay . *Faculty of Environmental and Life Sciences, School of Geography and Environmental Science. University of Southampton. United Kingdom.*

ABSTRACT

Attentiveness towards sustainability has expeditiously intensified due to the evolving climate emergency. Yet non-league football remains neglected in academic and media discourse regarding its capacity to become more sustainable. With non-league clubs at the heart of communities and climate change posing an imminent threat to society, this contemporary area warrants further exploration. Therefore, the aim of this project is to investigate sustainable practices and challenges restricting implementation across non-league football clubs in the South of England. Adopting a qualitative approach, this study employs semi-structured interviews with club representatives, alongside observations of club facilities. Analysis of these results conveys a prominent enthusiasm from clubs in improving their sustainability, with observations highlighting efforts in revenue diversification and a strong social sustainability focus. However, clubs encounter significant financial constraints and weak governance, hindering efforts. Despite these obstacles, this study concludes by identifying several opportunities for improving sustainability, including enhanced education, financial interventions, and increased regulatory support from the Football Association. Aligning with existing research on football's financial disparities, this study challenges elite football's resource-intensive operations and commercialisation. This is effectively achieved by elucidating the potential for non-league football to be a catalyst for positive sustainable change.

Keywords: Sport management, Football, Soccer, Sustainability, Environment, Socioeconomic impact, Grassroots sport.

Cite this article as:
Machay, J. (2026). The catalyst for change: Exploring sustainability and pressures in non-league football. *Sustainability and Sports Science Journal*, *4*(1), 55-103. https://doi.org/10.55860/PZRH7023

Corresponding author. *Faculty of Environmental and Life Sciences, School of Geography and Environmental Science. University of Southampton. United Kingdom.*
E-mail: jm24g22@soton.ac.uk
Submitted for publication October 06, 2025.
Accepted for publication November 16, 2025.
Published December 09, 2025.
Sustainability and Sports Science Journal. ISSN 2990-2975.

Identifier: https://doi.org/10.55860/PZRH7023

INTRODUCTION

The climate emergency and sustainability

Catastrophic, existential and disconcerting, the climate emergency is no longer a distant threat, with the Intergovernmental Panel on Climate Change (IPCC) asserting that human activities have warmed the Earth's climate by more than 1°C since the late 19th century (IPCC, 2021). Subsequently, the cataclysmic intensification of extreme weather events including floods, droughts, and storms considerably influence 3.6 billion people (UN, 2023) by displacing communities as well as destroying vital infrastructure. Additionally, global sea-level rise has expediated, with a mean escalation documented at 4.62 mm per year between 2013-2022 (ibid). These environmental alterations contribute to monumental biodiversity loss, with 1 million animal and plant species threatened with extinction (ibid). In response to the escalating threats, the term 'sustainability' has evolved into a widely utilised buzzword (Shao, 2024), transcending political, social and economic realms (Isgren and Longo, 2024). This prominence has been sufficiently reinforced via international forums including the United Nations (UN) Conference on Environment and Development in Rio (1992) and The Paris Agreement (2015), which stipulated the goal of limiting global temperature rise to well below 2°C above pre-industrial levels (UN, 2024).

The role of football

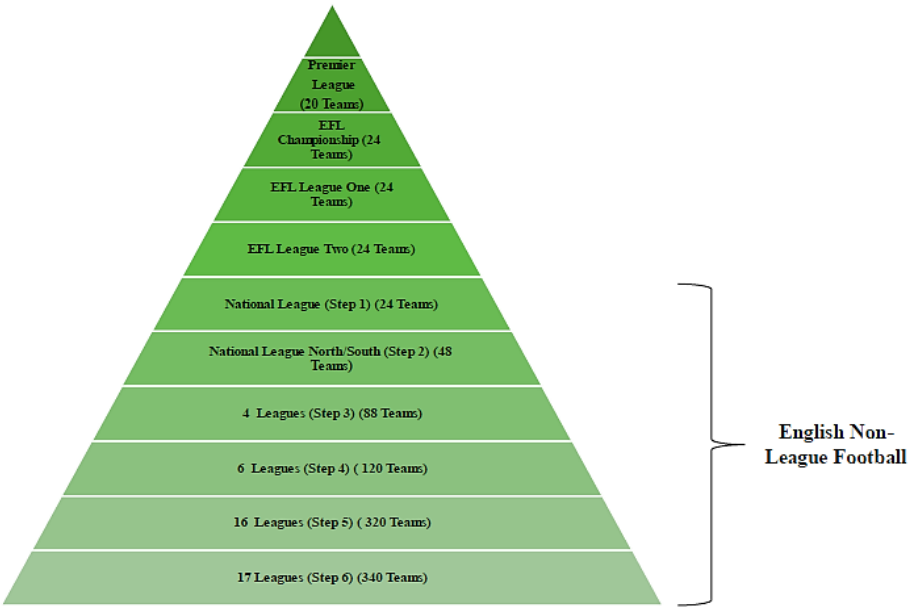
With over 5 billion fans across the globe (FIFA, 2021), football is the world's most popular sport, exerting significant influence on cultures, economies and the environment (Doidge et al., 2019). This perspective is demonstrated via recent football campaigns against racism, homophobia, and inequality. The Rainbow Laces campaign, launched by Stonewall (a UK LGBTQ+ rights organisation) in 2013, was embraced by footballers wearing rainbow-coloured laces as a symbol of support. Notably, the campaign contributed to a slight deterioration of homophobic attitudes in sport, with the percentage of fans who found homophobic remarks acceptable diminishing from 25% in 2017 to 14% in 2022 (Stonewall, 2022). Similarly, in June 2020, the Football Association (FA) expressed its unwavering support for the Black Lives Matter movement. This was demonstrated by the display of Black Lives Matter logos across shirts and the endorsement of players taking a knee before matches (The Football Association, 2020). In addition, clubs are often involved in community initiatives (Sanders et al., 2012), such as food bank donation drives (Amann and Doidge, 2023) and fundraising for charities.

These efforts demonstrate football's profound social impact, uniting communities and promoting equality on and off the pitch.

The neglected notion of non-league football

Evident in Figure.1, non-league football in England comprises of clubs situated outside the Premier League and Football League (EFL), spanning levels 5-8 of the football pyramid. Encompassing approximately 320 teams (FA, 2017), these divisions extend across the country, serving as vital centres for social cohesion and local identity (Irving, 2023). Since the COVID19 pandemic, non-league football in England has surged in popularity, reinforced by "*overall weekly crowds of 65,000*" (Scotson, 2022) in The National League (Step 1). This figure surpasses attendances across numerous second-tier leagues in Europe (ibid), underpinned by more affordable tickets and a community-focused atmosphere (Carmichael, 2020). Moreover, while professional leagues such as the German Football League have introduced sustainability guidelines, including compliance with climate protection efforts to participate in the league (Werner, 2023, p.5), English non-league clubs remain absent from this discourse. This notion is ardently sustained by O'Gorman, (2015, p.793) who established that there is a strong bias towards professional football leagues combined with an academic neglect of football at youth and grassroots level. This disparity raises apprehension regarding the

scalability of sustainability efforts across football pyramids, due to clubs possessing limited financial and technical resources.



Source: Authors own, 2025.

Figure 1. The English League Football system illustrating the non-league pyramid

Structure to follow and objectives

Consequently, this study aims to evaluate sustainable practices in English non-league football, specifically clubs located in the South of England. The discoveries obtained from this research intend to propose recommendations that can inform policy and support non-league clubs in operating more sustainably. Accordingly, this study will commence with a comprehensive literature review, identifying voids and depicting the current state of sustainability within football. Proceeding this, a qualitative approach including semi-structured interviews and observations of club facilities will be analysed. To supplement these methods, three coherent objectives of the study will be followed:

- Objective 1: To identify the key challenges and barriers clubs face in implementing sustainable practices.
- Objective 2: To evaluate current sustainable practices of English non-league football clubs.
- Objective 3: To propose recommendations for improving sustainable practices across English non-league football.

Henceforth, results, discussion and analysis will follow with limitations of the project discussed before conclusions and future research is suggested.

Literature review

Conducting a literature review is paramount to address notable gaps in academic research (Gratton and Jones, 2010), permitting this study to address coherent voids. Employing a systematic approach to gather relevant literature (Barisaux et al., 2024), databases such as Google Scholar, JSTOR, and Scopus were used to obtain a diverse range of sources. While sustainability has become a critical concern across industries including energy, fashion, and transport (Nosratabadi et al, 2019), its integration within football

remains an evolving discourse (Khanna et al.,2024). This narrative is substantiated throughout recent tournaments, including the 2022 FIFA World Cup in Qatar, promoted as the first carbon-neutral tournament. This involved significant investment in modular, sustainability-focused infrastructure, including venues constructed of repurposed shipping containers (Medjralou and Zaoui, 2023). However, the tournament's sustainability claims were met with controversy, citing concerns regarding high energy consumption, water usage for grass pitches in the desert and emissions linked to travel (Nufer, 2024). To a similar extent, scrutiny of sustainable footballing governance has been topical due to recent club ownership alterations in England. For instance, the take-over of Newcastle United by the Saudi Arabian Public Investment Fund in 2021 was predominantly funded by oil and gas reserves (Ingholt and Jørgensen, 2023), intensifying discussions regarding ethical responsibilities of clubs (Mabon, 2022, p.315). Moreover, literature related to this field fundamentally concentrates on top-tier professional clubs, perhaps attributed to its low commercial visibility and minimal media traction (Andrews and Harrington, 2016). Therefore, aligning with the projects overall aim of uncovering sustainability challenges in non-league football, this review will commence by defining sustainability in the context of football before analysing social, economic and environmental dimensions.

The concept of sustainability

The term sustainability is a contested, fuzzy discourse (Daddi et.al, 2021) as it encompasses several definitions, resulting in inconsistent use (Alhaddi, 2015). Contrarywise, this study will adopt the definition outlined in the 1987 United Nations (UN) Brundtland Commission, due to its acceptance as a foundational guideline for policy development. Hence, sustainability is defined as "*meeting the needs of the present without compromising the ability of future generations to meet their own needs*." (United Nations, 1987). As Membrillo-Hernández et al. (2021) emphasise, this definition encompasses three fundamental dimensions: environmental, social, and economic. Conversely, Stephenson (2023) contends that while cultural sustainability is not explicitly included in the Brundtland framework, it is integral to shaping sustainable development. Consequently, this study incorporates cultural aspects within the social dimension to acknowledge its broader influence. In conjunction, this research draws upon the Triple Bottom Line (TBL) framework, which evaluates performance across the three interconnected pillars (environmental, social, and economic) (Alhaddi, 2015). By applying the TBL perspective to this study, a holistic lens to assess the economic viability, social impact, and environmental responsibility of clubs will be accomplished. Proceeding 1987, allurement of sustainability has significantly escalated, stimulated by the establishment of the UN Millennium (MDG's) and Sustainable Development Goals (SDG's) in 2000 and 2015 respectively. Correspondingly, public awareness of sustainability has markedly increased, mirrored by adoption of trends including veganism, minimalism, and second-hand consumption, with the UK's second-hand retail sector growing by 27.2% in 2021 (Sabanoglu, 2021).

Sustainability in football

Over a decade ago, football began to recognise environmental responsibility on an international level through carbon reduction efforts (Collins and Flynn, 2008). Since this juncture, "*it appears little attention has been directed towards its study and even less work has filtered down the football pyramid*" (Carmicheal, 2020, p.7). This statement holds strong verisimilitude, heavily reinforced by Hernández et.al (2023) who note that despite its significant economic and social impact, the football industry has lagged in addressing sustainability-oriented strategies. Hence, objective two of this study will unearth current sustainable practices within non-league football. Furthermore, the lack of sustainability across football demands urgent improvement, consolidated via a recent study ascertaining that sport contributes to 0.4% of total global emissions (Marrucci, et.al, 2023). While this figure may appear minor, it surpasses the carbon footprint of some nations including Denmark (ibid). This value is sufficiently reinforced by major footballing events including Euro 2020 obtaining a significant environmental footprint, with emissions reaching 3 million tonnes of CO_2 (ibid). As Pereira et al.

(2019) note, these events generate various adverse environmental impacts through travel to matches, waste, as well as energy and water use to maintain pitches. Additionally, these events ensue astronomical financial ramifications (Pache, 2020) and social challenges including displacement of local communities (Gleason, 2023, p.5). While Pereira et al. statement holds considerable validity, they fail to acknowledge that grassroots football does engage in unsustainable practices. This notion is buttressed by Mabon (2023, p.316), who contends that considerable emissions from lower tier football clubs in England are largely attributed to travel and stadium related activities. Besides, a major challenge in sustainability efforts is the presence of "*greenwashing*" and "*social washing*." Whereby organisations promote misleading environmental claims to enhance their public image without substantial action (Mabon, 2010). Thus, this study will be aware of the phenomenon and attempt to avoid promoting misleading claims.

Economic sustainability and pressures in football

Economic sustainability in football refers to the ability of clubs to maintain financial stability while ensuring long-term viability (Villarino, 2021). This involves balancing revenue generation with expenditure and conforming to the obstacles proposed by commercialisation and sponsorship (ibid). Nevertheless, as Evans (2024) contends, financial distresses for football clubs include insufficient revenue generation, financial losses from relegation, TV broadcasting revenue, gate receipts and wages. Here, Evans provides a compelling rationale, particularly in the context of non-league clubs. This is because, unlike elite football clubs that benefit from lucrative broadcasting deals and commercial partnerships, lower-league clubs struggle to generate sustainable income. This is exemplified by the dissolution of clubs including Bury (2019), Macclesfield Town (2020), and Rushden & Diamonds (2011). Albeit the football authorities have attempted to mitigate unsustainable financial practices across football. To demonstrate, in 2004 the EFL introduced a Salary Cost Management Protocol (SCMP), restricting the spend that clubs could use on player wages. Proceeding this, in 2012 the Union of European Football Associations (UEFA) introduced 'Financial Fair Play' regulations to prevent clubs from spending beyond their earnings and ensure transparency in financial dealings (Villarino, 2021). In turn, this has boosted more sustainable financial management in the football industry. While these regulations do promote fiscal responsibility, Villarino fails to acknowledge that the regulations may also impose additional constraints on less affluent clubs (Evans, 2024).

Social sustainability and community engagement in football

Off the pitch, clubs serve as the heart of their communities (Scottish FA, 2024), fostering social sustainability, which can be referred to as the sport's ability to promote social cohesion. Elite clubs including Barcelona and Manchester United have been exemplars in fostering equitable and supportive initiatives through various charitable programmes (Kolyperas, 2012). Such initiatives elucidate the clubs' recognition of their responsibility to leverage their global platforms for social good. This notion holds strong validity, reinforced by Amann and Doidge's (2023) study of non-league Whitehawk FC's participation in Pledge Ball, which encouraged fans from various teams to compete in reducing their emissions. Whitehawk fans pledged to reduce their emissions by 175,000kg (Miller, 2021), highlighting how clubs can cultivate environmental awareness. Conversely, acquiring a business perspective, some scholars refer to social sustainability through the lens of Corporate Social Responsibility (CSR). This is well articulated by Porter (2019) who depicts CSR as the balance between business objectives and social goals, reinforced by clubs engaging with local businesses, schools, and the community (ibid).

Moreover, football functions as a formidable catalyst for social change, promoting equality and inclusion. Campaigns such as 'Show Racism the Red Card' and 'Rainbow Laces' actively challenge prejudice against racism and homophobia. Equally, symbolic gestures, such as taking the knee, evident in Figure.2 intends to highlight racial injustice, with 80% of players (in a PFA survey of 400 participants) (Sky News, 2020)

expressing their commitment to continue to support the campaign. Therefore, by harnessing its global influence, football can promote sustainability and foster social change.

Source: The FA, 2021.

Figure 2. England players taking the knee in fight against racial injustice before the start of a Nations League match.

Environmental sustainability and impact of football

As Werner (2023) proclaims, while the climate movement in sport is in its infancy, football and the environment share an undeniable relationship. Reinforced by Pereira et al. (2019), football impacts the environment through operational activities, while the environment provides appropriate weather conditions and natural resources such as the field of play. However, despite escalating apprehension regarding climate change, Khanna et.al (2024) argue that "*there is a lack of academic literature that explores the evaluation of football club's carbon footprints*" (p.1587). Authors juxtapose this postulation by emphasising the ecological footprint of stadiums. Reflecting this awareness, several clubs in elite leagues have initiated measures to mitigate their stadium's environmental footprint. For instance, Arsenal FC have equipped the Emirates Stadium with large-scale battery energy storage systems, running entirely on renewable energy (Vaughan, 2018). While this portrays a positive step towards sustainability, non-league clubs have taken limited action to address their environmental footprint (Khanna et al., 2024). Contrarywise, Mabon (2022) contends this notion by promoting the unique example of Forest Green Rovers who play in the National League (Step 1) and are hailed by FIFA (The International Governing Body of Association Football) as "*the world's greenest football club*" (UN Climate Change, 2020). The club has implemented numerous eco-friendly initiatives, including solar panels and the adoption of a vegan menu for players and fans. While this remains an isolated example, this approach demonstrates the potential for integrating environmental sustainability into non-league football operations. Moreover, travel to matches contributes heavily to a football club's carbon footprint. A recent study conducted by Loewen and Wicker (2021) displayed that the average football fan's carbon footprint amounts to 311.1 kg of CO_2 per year, with 70% of emissions attributed to personal transportation (p.1598). This indicates a major area for improvement, which remains largely unaddressed by many clubs (ibid).

Governance and policy influences

Effective governance and policy interventions are essential in promoting sustainability within football (Hernández et al., 2023). Within England, The Football Association (FA) play a crucial role in shaping footballing agendas, including regulations on financial management, stadium licensing and youth development. Still, while Carmicheal (2020) appropriately acknowledges that sustainability has been a key issue for the FA since 2007, he opposes that their efforts address their impacts as an employer, rather than the broader impacts of the game. This is a robust argument, advocated by the lack of regulations associated to sustainability set out by the FA across all football leagues in England. Conversely, as Mabon (2023)

connotes, organisations such as 'Football for Future' and 'Fossil Free Football' are lobbying governments, football associations, and leagues to implement policy towards climate change and environmental sustainability. Although, implementation remains inconsistent across different levels of the sport. This point holds strong verisimilitude, buttressed by the Football Foundation (UK Sport Charity) who fund facility improvements in the sport and encourage grant applicants to consider environmental impacts. Nonetheless, the Foundation "*does not offer specific advice, merely encouragement to consider those subjects*." (Carmicheal, 2020, p.8). Thus, objective three will propose recommendations for improving sustainable practices across English nonleague football.

Source: UN, 2022.

Figure 3. The United Nations 'Football for the Goals' Initiative, in Partnership with the UN Sustainable Development Goals.

Furthermore, on a global scale, international organisations including the UN and UEFA have attempted to provide suitable frameworks to encourage sustainable practices across world football (Hernández et. al., 2023). This is supplemented by Figure.3, which depicts the UN's 'Football for the goals' initiative, launched in July 2022, which provides a platform for the football community to engage with the SDGs (UN, 2022). This has prompted the development of significant transnational policy documents for sport, with notable examples including the Kazan Action Plan (2017) and Commonwealth policy guidance, which accentuate the position of sport in nurturing social inclusion, peace and development (Bjelkanovic, B., 2020). While using the SDGs as a lens to analyse sustainable practices within non-league football would provide an insightful perspective, this study will not adopt it. This is because non-league clubs hold limited awareness of the SDGs, so this study will align with the TBL framework instead.

Research gaps and conclusion

In conclusion, while authors such as Mabon (2022) and Carmichael (2020) have contributed significantly to the comprehension of economic, environmental, and social aspects of sustainability in the context of football, research on the English non-league pyramid remains sparse. While literature is relatively recent, depicting ongoing fluxes in policy, governance, and club operations, it overlooks the unique challenges and opportunities at this level, including its reliance on community support and limited financial resources. Ergo, this study aims to address these gaps by exploring how non-league clubs are attempting to become more sustainable while navigating evolving pressures. This will be achieved by employing semi-structured interviews and observations to evaluate sustainable practices, identify barriers for implementation and propose recommendations for improving sustainable practices of non-league clubs, aligning with the objectives.

METHODS

Research approach

To align with the study's primary aim of investigating the sustainability of non-league football clubs and barriers for implementation, this research employs an inductive, qualitative approach. As Bjelkanovic (2020)

notes, quantitative research records observable phenomena, while qualitative methods provide deeper contextual insights beyond numerical data. Thus, semi structured interviews serve as the predominant data collection method as they are the most effective and convenient approach of gathering information (Qu and Dumay, 2011). Moreover, this research will adopt a grounded theory approach (Gratton and Jones, 2010), permitting the emergence of themes and theories to rise inductively from the data via analysis (Khan, 2014). In addition to interviews, observations of club stadia will be conducted to evaluate sustainability practices in real-world settings. Observations will include infrastructure, waste management practices and energy usage. This approach is firmly reinforced by previous research in sport ecology, where interviews have been employed to investigate environmental and sustainability concerns within sport organisations (McCullough, 2013 and Carmichael, 2020).

Source: Authors own, 2024.

Figure 4. Illustration depicting the research path taken.

Epistemological and ontological considerations

Ontology examines the nature of reality (Gratton and Jones, 2010), while epistemology explores how knowledge regarding reality is acquired and validated (Al-Ababneh, 2020). Epistemological and ontological considerations of sustainability in non-league football centre on the role of supporter involvement and ownership as fundamental aspects of its social existence. Therefore, this study assumes an interpretivist epistemology and a constructivist ontology, facilitating an in-depth comprehension of club experiences interpreting sustainability. Likewise, this study acknowledges that these perspectives are moulded by valuable interactions, sufficiently reinforced by Burrell and Morgan (1979) who dispute that the concept of supporter involvement and ownership exemplify existence within broader social frameworks Ontologically, football is more than a game (Irving, 2023), representing clubs as pillars of their community, that fulfil social requirements, fostering a sense of belonging and pride. Alternative approaches, such as positivism are rejected due to their limitations in capturing the depth and complexity of human experiences. As demonstrated by McCullough (2013), qualitative interviews provide a means to investigate attitudes and social norms in ways that statistical tools cannot. Above all, the epistemological foundations of sustainability in football, particularly within governance and long-term planning, remain underexplored. This gap stresses the obligation for further research to clarify responsibilities in ensuring club sustainability and governance.

Sampling

This study used purposive sampling, (Draper, 2009) investigating clubs located between steps 1-6 of the English non-league pyramid. Clubs were contacted following reference of the FA handbook, which provided a comprehensive and up-to-date database of non-league clubs. This method strongly aligns with the objectives of uncovering barriers and current sustainability practices, as it facilitates interaction with participants who are actively involved in club operations. Initially, the study targeted clubs within The Combined Counties Football League (Step 6). However, due to limited responses, the scope was expanded to clubs located between steps 1-6, as clubs beyond this often lack dedicated facilities and have limited external staff. This systematic approach was first executed via a blanket email, (Appendix B) sent to 230 clubs situated across the South of England, in leagues achievable to reach in-person, minimising the environmental footprint of the project. Although, to introduce geographical diversity, one club from the North

of England was included to provide comparative insights into sustainability practices across different areas. Conversely, alternative methods including random or stratified sampling would not have been appropriate, as clubs determined by probability sampling may not have been willing to cooperate in this study. Though, as Sharma (2017) accentuates, purposive sampling could lead to selection bias. This may occur due to participants being selected based on their availability rather than through random selection (ibid). While this is a reasonable statement, convenience sampling is appropriate as it facilitates the inclusion of clubs with varying levels of engagement in sustainability practices.

Data collection

Data collection was conducted during the summer off-season to ensure the availability of stakeholders. While it is paramount to acknowledge stakeholders such as supporters, players, and governing bodies, this study focuses on chairpersons, secretaries, and commercial officers due to their pivotal role in decision-making and implementing sustainable initiatives within clubs (Marrucci et.al, 2023). Semi-structured interviews were conducted both in person and online, lasting 30-50 minutes, with stadia observations solely occurring in person. This approach was inspired by the work of Irving (2023), who employed similar qualitative methods to explore community ownership models in football. Succeeding, Knox and Burkard's (2009) interview guidance, participants were allocated control over the interview location, allowing them to select the setting in which they felt most at ease, including boardrooms, clubhouses and changing rooms. Whilst 25 pre-determined interview questions were formulated (Appendix E), the flexibility of a semi-structured approach actively encouraged a two-way dialogue (Longhurst, 2003). Similarly, this approach over alternative methods, such as focus groups and questionnaires, enabled an enhanced and more detailed exploration of participants' thoughts. This is sufficiently reinforced by McCullough's (2013) work, in which interviews were used to record attitudes and behavioural controls in relation to sport and the environment. In conjunction, an informal pilot interview involving a volunteer from a community football club unaffiliated with the sample was conducted to refine the interview schedule.

Data analysis

Observation notes and interviews were transcribed employing NVivo software, facilitating familiarisation of the data in a preliminary form of analysis, also known as 'essence capturing' (Saldana, 2022). This inductive approach captured vital information relating to the research objectives by collecting perception and knowledge grounded in human experience (Azungah, 2018). Proceeding this, an inductive thematic analysis (Nowell et al., 2017) approach was adopted, modelled by the work of Miles and Huberman (1994). This ensured a comprehensive grounded theory examination, permitting the emergence of recurring themes across the data to be recognised. This method was selected over content analysis, which involves determining themes prior to coding. This is due to permitting both emic and etic perspectives to be analysed during coding (Flowerdew, 2008), ensuring a nuanced approach to comprehending the data (Ibid). Subsequently, the coding process progressed through five main stages (Vaismoradi et al., 2016):

Table 1. Key stages used during data analysis (Source: Author's Own, 2025).

1	**Familiarisation with the data:** Reading and transcription of the data to gain an overall understanding.
2	**Initial coding:** Open coding of the data set to generate initial codes.
3	**Searching for themes:** Grouping of similar codes to establish potential themes by utilising descriptive coding.
4	**Reviewing themes:** Pattern coding including the refinement of data to uncover relationships and recurring patterns.
5	**Thematic analysis:** Generation of codes and themes, resulting in the synthesisation of patterns and broader themes, addressing the research objectives.

Nonetheless, due to the manageable dataset size, a manual coding approach (Flowerdew 2008) was elected instead of a software-based method such as auto coding, ensuring close engagement with the data. Initially,

relevant words and phrases were identified and assigned codes through open coding (Allen, 2017) to capture key themes and establish inductive connections between data. Then Axial coding (ibid) was applied using techniques suggested by Saldana, (2022) to identify relationships and refine categories. Finally, selective coding synthesised analytical patterns into broader explanations, which will be analysed in the proceeding chapters.

Ethical considerations

Ethical considerations are paramount to consider, ensuring research is both socially and morally acceptable (Gratton and Jones, 2010). This study adhered to stringent guidelines, with ethical approval obtained on: 22/07/24 (Appendix A), complying with the Ethical Review Governance Office (ERGO) standards which included a comprehensive risk assessment. Besides, as Henn et al. (2021) caution, ethical considerations may appear as "*boxes that simply have to be ticked in the right way*", rather than genuine safeguards. Accordingly, prior to conducting interviews, participants were prescribed the opportunity to ask questions, ensuring they were fully informed. In conjunction, stakeholders were required to sign a consent form (Appendix D) which are stored securely behind a password protected OneDrive. Moreover, participants were also provided a participant information form (Appendix C) displaying their rights, including the ability to withdraw from the study within 30 days post-interview and the right to anonymity. Similarly, observations were unobtrusive and caused minimal disturbance. Likewise, recognising that ethical research extends beyond a mere box-ticking exercise, assurances were taken to ensure genuine informed consent. Hence, language used in the participant information documents and interviews was transparent and free from technical jargon, preventing potential deception. Simultaneously, participants were offered follow-up opportunities and a condensed report summarising the findings, which will be sent after the study's completion. This approach is not only ethical but also aligns with the principle of giving back to participants (Cloke et al., 2004).

Validity and reliability

Ensuring validity and reliability in study methods are essential for producing accurate and truthful data (Gratton and Jones, 2010). As the study sought personal views, potential bias was considered by offering anonymity to reduce the fear of judgement. This is reinforced by Irving (2023) who suggests that research must focus on the subject matter, rather than diverging into areas of personal interest. Similarly, accurately transcribing interviews ensured no one was misquoted, giving the study integrity. Moreover, while qualitative research does not seek replicability in the same way as quantitative research, steps were taken to enhance verisimilitude. For instance, standardised interview schedules (Appendix E) and observational criteria were adhered to. Nonetheless, Pierce and Lawhon (2015) probe the validity of observations, highlighting that "*observations made while walking are not rigorously sampled or subject to tests of reliability*" (p. 4). While this criticism is credible, recorded observations provide valuable insights and strongly support findings, despite lacking formal rigor.

Methodological issues

As with any research project, several challenges arose, with a primary issue involving participants requesting online interviews due to time constraints. This limitation restricted in person observations of club facilities and may have hindered rapport-building, impacting response depth (Dowling, 2005). Nevertheless, the researcher holds a strong comprehension of the cultural and logistical dynamics of the sport, ensuring rapport was fostered from the outset.

In a similar fashion, anonymity requests imposed constraints on the research, limiting the level of detail that could be disclosed including club name, location and images of good practice. Furthermore, using purposive

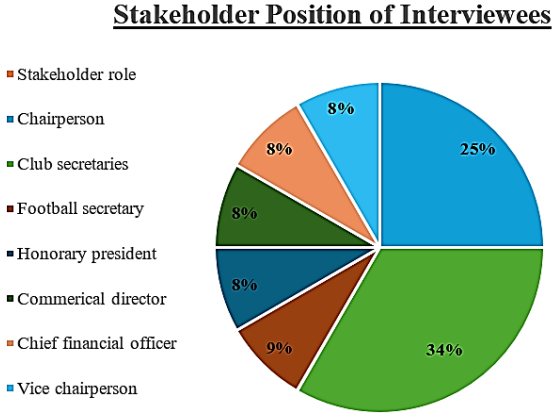
sampling introduced the risk of researcher bias in participant selection (Sharma, 2017). Although, due to non-responses, it was paramount to use this method to ensure that the sample aligned with the research objectives (Gratton and Jones, 2010). Still, while clubs were permitted to nominate stakeholders for interview, it is crucial to acknowledge that all interviewees occupied more senior positions than the researcher, raising the possibility that these individuals might wield what Fleming (2019) defines as informal power. Similarly, the topic's potential negative implications for club reputation introduced biases, such as participants potentially framing their responses defensively or emphasising positive aspects of their club. Despite these limitations, the chosen methodologies facilitated rich qualitative exploration, offering valuable insights to the broader academic discourse.

RESULTS

This chapter delineates results obtained from semi-structured interviews and stadium observations to comprehend how sustainability is defined and implemented across non-league football clubs in the South of England. This will be competently attained by illuminating dominant themes (Nowell et al., 2017) and insights that have emerged from analysis complemented by NVivo software (Limna, 2023). Through its epistemological intervention, this section will challenge prevailing narratives of elite football, which often neglect the nonleague pyramid (Wilson, Ramchandani and Plumley, 2018). Henceforth, this chapter will summarise the results before being divided into 6 sections, aligning with the research objectives. The discussion will commence by exploring the comprehension of sustainability within non-league, identifying the barriers to its implementation as well as the current practices in place. Proceeding this, it will propose recommendations for advancing sustainable practices across the English non-league pyramid, before addressing the study's limitations and exploring potential future developments in the field.

Participant overview

In response to the initial participant recruitment emails, 13.91% (n = 32) of clubs responded. This response rate was influenced by factors encompassing scheduling conflicts and a lack of club resources. However, interviews were conducted with 37.5% of the initial (n = 12) cohort. While this percentage may ostensibly appear low, the sample size does resolutely correlate with prior sport ecology research which obtained a similar sample size (Baldwin, 2010 and Carmichael, 2020), before reaching thematic saturation (Biddle et al., 2001). These interviews were conducted with clubs ranging from step 2 of the non-league pyramid (Vanarama National League South) to step 6 (Combined Counties Football League Division one).



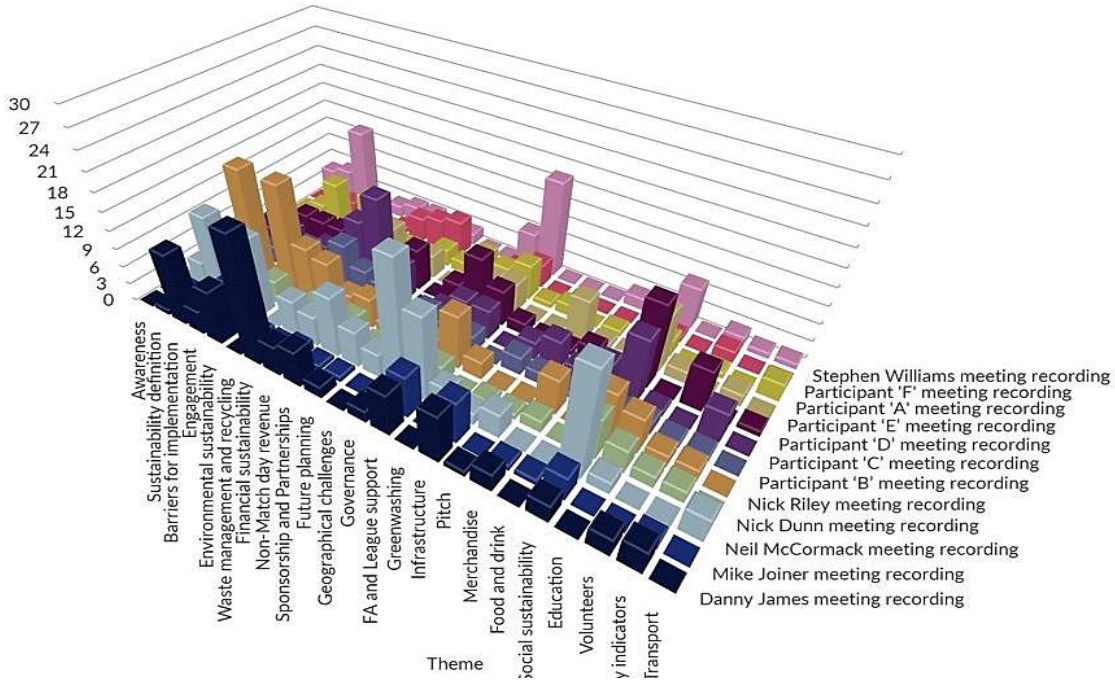
Source: Authors Own, 2025.

Figure 5. The frequency of positions held by stakeholders who partook in the study.

Depicted in Figure.5, participants included club stakeholders comprising of chairpersons, secretaries, an honorary president, commercial director and a chief financial officer. Due to anonymity disclosure, participants will be referred to as Participant A-L (Table.2), to reduce identifying details (Saunders and Kitzinger, 2015). Although, several clubs expressed a desire for their names to be mentioned, aligning with the notion that stakeholders actively seek increased media attention (Cleland et al., 2018). Therefore, the occasional use of participant or club name will be presented when contextually relevant to enhance clarity and integrity of the findings.

Table 2. Participant information table including name, club, role, and reasoning behind interview motivations (Source: Authors own, 2025)

Participant Name	Club	Role	Location/ Date	Reason for Interview
Nick Riley	Abbey Rangers	Chairman	Addlestone Moor (Stadium), 31/08/24	Nick has been Involved with the club for 17 years, serving on the club's committee before becoming chairman. He has a holistic overview of the club including knowledge on current sustainable practices and the long-term vision of the club. Nick is extremely passionate regarding community engagement, youth development and the environment.
Danny James	Bedfont	Football Secretary	Online, 21/08/24	Possessing a wealth of football and regional knowledge, Danny was involved with coaching before his current role as secretary. Danny provides an operational perspective that oversees club logistics and operations. As well as a comprehension of compliance regulations outlined by the league and governing bodies.
Mike Joiner	Chase Town	Honorary President	Online, 26/09/24	Mike has been associated with the club for nearly 60 years, offering a wealth of experience and insight into the club's evolution from grassroots level. Having overseen recent investment, Mike possess strong relationships with stakeholders and acts in an advisory role for other teams, collaborating closely with the FA. Additionally, interviewing a club in a different part of the country provides geographical variety.
Nick Dunn	Deal Town	Commercial Director	Online, 11/10/24	Nick is responsible for the club's engagement with the local community, partners and has been at the club in an official role for 4 years. Nick focusses on acquiring additional sponsorship and is a referee development lead for the Kent FA.
Neil McCormack	Real Bedford	Club Secretary	Ledger Stadium, 22/09/24	Neil oversees club facilities and infrastructure while coordinating short and long-term requirements of the club. This encompasses ground grading requirements and compliance with governance regulations.
Stephen Williams	Wokingham Town	Chairman	Online, 02/09/24	Stephen has progressed from being involved in the youth section of the club to chairman. This involvement spans several years and involves overseeing all aspects of the club.
Participant A	Anonymous	Club Secretary	Online, 11/10/24	Anonymity Requested
Participant B	Anonymous	Club Secretary	Online, 30/08/24	Anonymity Requested
Participant C	Anonymous	Chairman	Stadium, 14/09/24	Anonymity Requested
Participant D	Anonymous	Vice Chairman	Stadium, 05/10/24	Anonymity Requested
Participant E	Anonymous	Chief Financial Officer	Stadium, 21/10/24	Anonymity Requested
Participant F	Anonymous	Club Secretary	Online, 29/08/24	Anonymity Requested



Source: NVivo, 2025.

Figure 6. Thematic frequency analysis.

Thematic exposition

Data extracted from the interviews analysed through NVivo, divulges several key themes. Thematic frequency across each interview is illustrated in Figure.6, with highly referenced themes including social sustainability (88), barriers for implementation (88), environmental sustainability (79), financial sustainability (79), FA and League support (85). This aligns with current literature, which highlights that football clubs play a central role in their community (Baldwin, 2010) and that sustainability is a rapidly emerging topic within the sport (Villarino, 2021). Conversely, the lowest referenced themes include waste management (21), sustainability metrics (18), education (17) and transport (9). These results are surprising given footballs widely recognised role as an educational vehicle (Sanders et al., 2012). In parallel, these findings imply that non-league football still encounters complications in attaining long term sustainability, supplementing Carmichael's (2020) assertion that financial and operational stability remains elusive for lower-tier clubs.

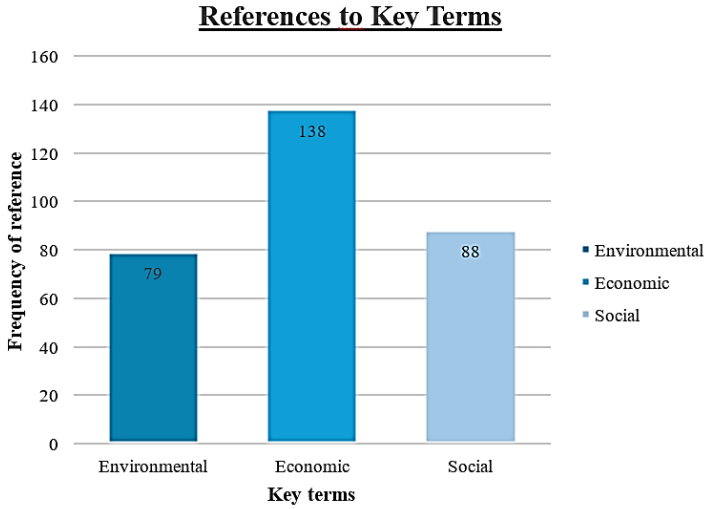
DISCUSSION

Awareness and conceptualisation of sustainability

The sample accentuates a mixed comprehension of sustainability as a concept, coinciding with the affirmation that sustainability is a contested and fuzzy discourse (Alhaddi, 2015). 66.67% of stakeholders primarily associated the term with financial viability, exemplified by Figure.7, which outlines that economic terms such as "*revenue*", "*budgeting*" and "*cost*" were mentioned the most compared to environmental and social aspects. In combination, statements including: "*sustainability is principally about the economic sustainability*" (Participant K) as well as "*sustainability in our eyes means that we don't spend beyond the revenue that the club actually generates*." (Participant C), represents a confined focus, coinciding with existing literature (Plumley, 2018, p.9). This is profusely fortified through the recent bankruptcy of several nonleague clubs (Irving, 2023), with stakeholders looking to avoid similar misfortunes. Nonetheless, the concept of sustainability extends beyond financial aspects, with several club representatives recognising this.

For instance, Participant G advocates that "*sustainability doesn't finish or end anywhere...It crosses so many factors*.," indicating a holistic comprehension. This connotes an increasing perception of sustainability within the game, converging with Todaro et al. (2023), who assert that an awareness of sustainability among key football club stakeholders is essential due to the increasing pressure from fans, sponsors, and regulatory bodies to adopt sustainable practices. Moreover, the increasing consciousness of sustainability is buttressed by 41.67% of clubs expressing a desire to operate in a more environmentally friendly manner, affirmed by the statement:

> *"[We are] trying to make sure that the club operates in a way that becomes a bit greener, trying to ensure that we operate in a way that's as environmentally friendly as you possibly can" (Participant J).*



Source: Authors own, 2025.

Figure 7. Frequency of the three key terms mentioned across the interviews.

This propounds that while there is a perception of issues, implementation remains a challenge for non-league clubs (Carmicheal, 2022). Correspondingly, additional aspects of sustainability, including social and cultural dimensions, were acknowledged, albeit to a lesser extent. Although all participants demonstrated their club's awareness of their pivotal role within the community, associating with the broader societal responsibility that clubs hold (Baldwin, 2010). To a similar magnitude, the awareness of greenwashing among clubs appears mixed, with the term mentioned only 10 times across all interviews. While some club officials (n = 4) portrayed a basic understanding of greenwashing, others were unfamiliar. Participant G demonstrated a nuanced understanding, recognising greenwashing as a practice of making empty promises about environmental initiatives. This explicit stance is proactive, aptly conforming with established definitions across literature (Miller, 2017). This suggests a growing shift toward transparency and meaningful initiatives rather than superficial PR efforts. Overall, the disparity of interpretations and actions of sustainability stipulates a necessity for coherent communication and education from football governing bodies, bridging the knowledge gap.

Sustainability measuring metrics

One interesting finding lends itself to the state of sustainability measurement metrics across the footballing pyramid, which remain in their nascent stages. While no club exhibited a strong monitoring of their sustainable practices, (n = 3) clubs have adopted ad-hoc approaches, related to finance. For instance, Participants C

and I focus on recording attendances, food purchases, and "*per-capita spending*" (Participant C) as proxies for financial sustainability. In contrast, findings demonstrate that other non-league clubs struggle to quantify sustainability metrics. As one participant stated, "*I think it's quite difficult to put something quantifiable in place*" (Participant J). This is primarily due to the absence of clear guidelines and the financial constraints that prevent investment into robust tracking systems. Furthermore, unlike professional clubs that report carbon footprints and community engagement metrics (Pereira et.al, 2019), non-league teams often rely on informal assessments. This variation suggests that sustainability measurement is highly context-dependent and influenced by club priorities, rather than a standardised approach. Equally, a surprising result was that teams situated higher up the non-league pyramid demonstrated less aspiration to become more sustainable, compared to those lower down. One would expect larger teams, with greater financial resources and infrastructure to be more proactive in implementing sustainability measures. This result provides a new lens to future policy, juxtaposing existing literature which presents an elitist fixation on professional football, where structured ESG (environmental, social, and governance) disclosures and comprehensive sustainability strategies are more prevalent (Zülch, Cruz and Kirsch, 2021).

Source: Authors own, 2025.

Figure 8. Word cloud consisting of key barriers to sustainability identified by participants.

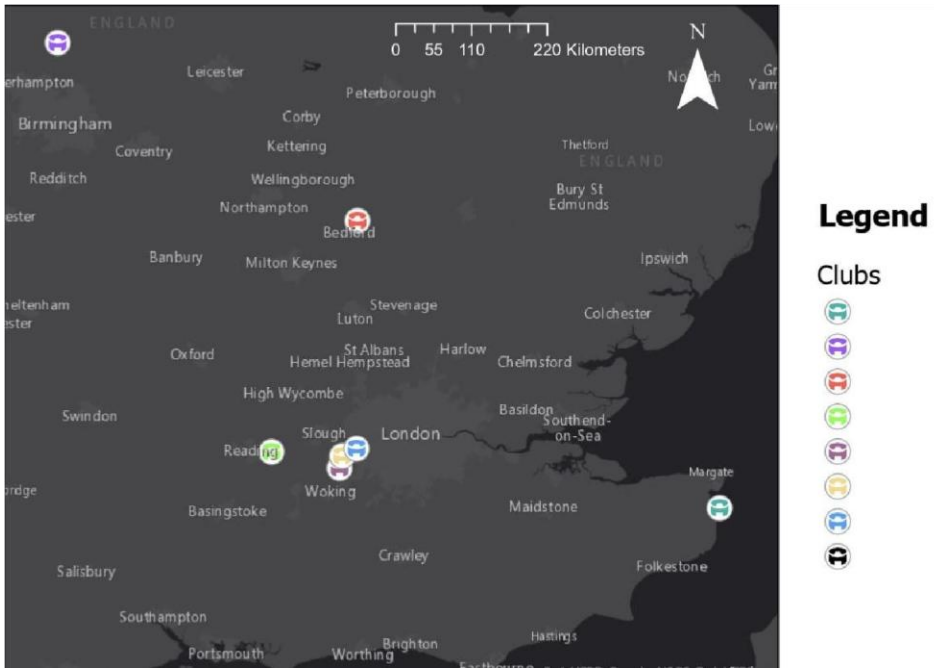
Barriers in implementing sustainable initiatives

Financial constraints

Linking directly to research objective one, encapsulated in Figure.8, financial constraints emerged as the primary obstacle for most clubs in implementing sustainable measures. This is consistent with Maguire and Philippou's (2023) research on the financial sustainability of clubs, accentuating that clubs tend to operate negative cash flows with heavy reliance on owner funding, intensifying peril of financial instability. A correlated discovery is the heavy reliance on grants, sponsorship and gate receipts outlined by most participants. This denotes the complexity for clubs in allocating funds towards implementing sustainable practices. On the contrary, while sustainability initiatives including LED lights and electric vehicle charging points are often considered to be "*more expensive to buy and to install*" (Participant H), they tend to be cheaper in the long run (Bello, 2020). Although, as Participant G indicates, obtaining the initial funds remains a challenge. This is becoming increasingly difficult with non-league clubs facing increased operational costs, player wages and a lack of commercial revenue streams (Maguire and Philippou, 2023).

Geographical challenges

The physical location of clubs presents another substantial barrier. Findings indicate that exogenous factors including topography, geology and settlement areas limit the implementation of sustainable practices.



Source: Authors Own, ArcGIS, 2024.

Figure 9. Map of the study site including icons positioned at each club interviewed.

Exhibited in Figure.9, most clubs interviewed were situated West of London in Berkshire and Surrey, with other clubs in Kent and Bedfordshire. Although, one club is situated "*in a flood zone*" (Participant K) and another's ground is "*largely clay*" (Participant F), resulting in persistent drainage issues, leading to waterlogging of the pitch and frequent match postponements. Thus, straining the already limited resources of these clubs and further exacerbating the difficulty of implementing sustainable practices. While these findings do supplement extensive literature on climate change's impact on football clubs (Mabon, 2020 and Baldwin, 2010), by illuminating how shifting environmental conditions are disrupting operations, minimal academic work has addressed the broader geographical constraints that hinder sustainability efforts at non-league level. This void indicates that more attention should be allocated to specific locational difficulties faced by clubs. Furthermore, several clubs are situated in suburban areas with poor public transport connections. This is reinforced by Participant K who states, "*We're not very well served by public transport*." While this may affect matchday attendances, geographical location can provide clubs with an opportunity to become more sustainable. For instance, since traveling by car is the primary choice for fans attending games (McCullough, 2013), clubs could draw inspiration from Sunderland AFC who provide a complimentary park-and-ride service along with cycling storage for fans. Similarly, results allude that displacement because of urban regeneration projects have displaced neighbourhoods that historically supported local clubs (Participant D). The relocation of these communities leads to a decline in volunteer numbers and financial contributions, weakening the clubs' ability to invest in sustainable initiatives (Jakobsen et.al, 2009).

Lack of governance and a regulatory vacuum

A salient barrier emerging during interviews was the lack of support from governing bodies, including the FA and regional leagues. Several participants mentioned that while the FA provide general advice on economic sustainability and best practice, there are "*no specific regulations or standards set by the FA or league regarding [social or environmental] sustainability*" (Participant A). Instead, communications from the FA typically focus on welfare and spectator behaviour rather than environmental issues. This critique is echoed

by Bury (2015), who questioned the FA's action plan to combat homophobia in football. Homogenously, regulatory frameworks imposed by leagues and the FA cultivate additional financial burdens that can detract clubs from pursuing sustainable practices. For instance, league mandates, such as printed programmes and ground grading criteria, impose high costs on clubs without incentivising sustainability. The FA's 56-page ground grading requirements (FA, 2024) outline facility standards for each non-league tier, covering pitch dimensions, changing rooms, floodlights, and hospitality provisions. Although, one participant expressed:

> *"There's no clear guidance...the FA are not pushing it [sustainability]... you're supposed to have some seats in your stand marked for away directors and home directors. Come on, we're step five football...it's a tick box exercise" (Participant L).*

Table 3. Key Themes and Stakeholder Perspectives on football governance and financial support (Source: Authors own, 2025).

Topic	Exemplary Quotes and Comments
League Programme Requirement	"*The league insists that we put a program out every week, and it can be online, or it could be hard copy*." – Participant H
Financial Support from FA & PL	"*The fund from the Premier League has really helped*." – Participant H
FA Grants & Loans	"*We had something like a £5,000 grant and a £7,000 loan, which we had to pay back... that's why I called it regurgitated money*." – Participant I
FA Inspections & Ground Grading	"*We have an inspection every three months to make sure that the bounce is still as good as it should be*." – Participant I
FA Sustainability Support	"*I don't actually think there's ever been anything about sustainability*." – Participant F
League Economic Oversight	"*We have to provide them with accounts every year for them to make sure that we are not going above and beyond*." – Participant E
FA & League Regulations	"*We get emails through all the time from the league about what we have to do, what we shouldn't do*." – Participant L
Grant Conditions	"*There are grants available, but in our experience, they're not that easy to obtain, and they come with a lot of conditions*." – Participant C
Sustainability Efforts	"*No, nothing environmentally... Not, not that I'm aware of. There has been a project through the county FA about going green*." – Participant J
Ground Funding Support	"*The FA did have a partnership with some builders companies... you could get a decent deal on construction material*." – Participant A
League Stadium Standards	"*Stadium power is a new initiative from the league where your ground's got to meet certain gradings*." – Participant D
FA Priority Areas	"*All of their initiatives are mainly around football for all, safeguarding, Rainbow Laces... but not much on sustainability or finances*." – Participant G

This reflects severe frustration with the absence of reasonable and sustainable ground-grading criteria. Moreover, this regulatory vacuum extends to the governmental level, where clubs have expressed a lack of incentives or support for sustainability from policymakers. This is reinforced through a study conducted by Khanna et al., (2024) who detected a lack of government incentives to switch to renewable energy sources. Contrarywise, non-league clubs do receive some support through local initiatives and grants. As one participant noted:

> *"The Football Foundation is fantastic in providing assistance through grants" (Participant K).*

However, these are often fragmented and insufficient to address the overarching lack of governance and regulation in sustainability. Comparably, Non-Governmental Organisations (NGO's) including Football for Future is aiming to build sustainable culture within football, leading audits and workshops to educate

stakeholders (Football for Future, 2024). Beyond this support, the ownership and governance of stadiums further compound transitions to becoming a more sustainable club. For example, (n = 2) clubs operate in council-owned facilities, limiting their control over infrastructure modifications. Observations revealed that this often leads to neglect of facilities and delays in essential maintenance and upgrades. This challenge is exacerbated by bureaucratic inefficiencies, as highlighted by Participant A who claims that:

"Trying to get a local council to do something can be the proverbial banging a head against a brick wall."

These prolonged delays can discourage clubs from pursuing sustainable improvements, cultivating a perpetual cycle of stagnation.

Lack of volunteer support

The void of volunteers across non-league football postulates a considerable barrier to the implementation of sustainable initiatives. Non-league clubs are heavily dependent on volunteers, a reliance that has been long established (Cuskelly, Hoye and Auld, 2006), reinforced by nearly 60% of participants (n = 7) in this study. Conversely, as one participant claimed, "*I think the volunteer sector generally across the country is probably drying up a lot with the cost-of-living crisis*" (Participant D). This aligns with a study by Papić (2022), who highlights that growing demands on volunteers within grassroot sports have deterred participation, as well as broader societal trends. Correspondingly, volunteers within the game are subject to roles which often lead to task and social frustration (Nichols, 2024). Thus, negatively impacting volunteer retention and restricting clubs' capacity to become more sustainable. Therefore, addressing the volunteer crisis will be crucial for non-league clubs to make meaningful progress in sustainability.

Cultural and educational obstacles

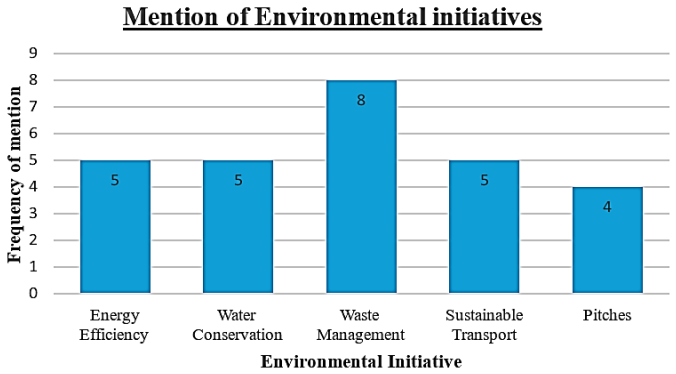
The lack of education and cultural awareness surrounding sustainable practices is a notable barrier for clubs to become more sustainable. One participant recognises that generational differences in perception can lead to scepticism regarding sustainable initiatives. As older supporters and club leadership may be more resistant to change, favouring to protect the club's historical practices (Ward and Hines, 2017), with some viewing sustainability as "*another fad*." (Participant H). As studies suggest, this cultural reluctance to alter established behaviours is particularly pronounced in lower-tier clubs, where sustainability may not be viewed as a priority or achievable goal (Carmichael, 2020). Hence, this resistance makes it difficult to gain internal support, impeding the adoption of sustainable approaches, such as reducing single-use plastics or embracing renewable energy sources. In a similar fashion, club officials lack the necessary knowledge or tools to effectively implement sustainable initiatives, which significantly hampers progress. Studies have exhibited that sustainability education is often not a priority within sport management programmes, leaving club officials underprepared to drive sustainable alterations within their club (Graham et al., 2018). Therefore, clubs remain unaware of how to improve their sustainability and are unconscious of potential grants that could transition the club to more sustainable operations.

Implementation of current sustainable practices

Environmental initiatives

Linking directly to research objective two, among the interviewed clubs, environmental initiatives were generally limited. Although, evident in Figure.10, clubs are imposing elementary practices including recycling and energy-saving measures. For instance, one participant stated, "*we've got LED lighting everywhere in the club...and sensors*" (Participant I), phasing out energy-intensive incandescent or halogen bulbs. This finding correlates with the recognition that lighting represents a significant contributor to energy consumption in

football stadiums (Marrucci, Daddi, and Iraldo, 2023). Perhaps indicating that awareness of sustainable transitions are permeating down the football pyramid. Furthermore, the findings indicate a strong fixation on transitioning towards the use of 3G (third generation) artificial pitches as a potential solution to environmental concerns. This is because they require less water, fertilisers and maintenance compared to traditional grass pitches (ibid). Correspondingly, 3G pitches can be used more frequently as they're highly durable resulting in less postponements. However, as noted, "*3G pitches use rubber crumb*" (Participant K). This concern is consistent with wider concerns regarding pollution from polyethylene, nylon and rubber pellets entering water courses (Bø et al., 2020). Besides, this area remains a contested discourse, with limited research into the climate impacts and benefits of hosting football on 3G surfaces (Mabon, 2022).



Source: Authors own, 2025.

Figure 10. Frequency of environmental initiatives mentioned in the interview process.

Source: Authors own, 2025.

Figure 11. Image of waste disposal at the site of Abbey Rangers.

Likewise, current environmental sustainability initiatives primarily focus on areas such as waste and water management. (n = 2) clubs are adopting rainwater collection systems to reduce water consumption for pitch maintenance, inspired by pioneers like Forest Green Rovers (Delia, McCullough and Dalal, 2024), who have introduced organic pitch maintenance (ibid). Equally, evident in Figure.11, several clubs have established basic recycling systems, including "*standard bins for: glass bottles...paper...cardboard...cans…and general waste*" (Participant D). This approach highlights the importance of correct waste segregation to reduce landfill contributions (Costello, McGarvey and Birisci, 2017). Similarly, both Deal Town and Abbey Rangers have introduced reusable cups to reduce single-use plastics. This involves a deposit return scheme, whereby fans

pay a small deposit when purchasing a beverage, which is refunded upon returning the empty container to a designated collection point (Zhou et al., 2020). Integrating these systems not only improves the sustainability of the club but also enhances fan engagement by fostering environmentally responsible behaviours (Casper, 2017). On top of this, notable environmental initiatives include plans to install cycling facilities and encourage car sharing to promote sustainable transport. This corresponds with conclusions by Marrucci, Daddi and Iraldo (2023) who determined that carpooling offers an eco-friendlier travel option by decreasing pollution, alleviating traffic congestion, and reducing the demand for parking spaces. Similarly, Abbey Rangers donated their old goalposts to Runnymede Borough Council, facilitating a circular economy (Khanna et al., 2024). Nonetheless, transitioning to more sustainable merchandise and food suppliers was minimally mentioned, perhaps due to cost considerations. Overall, while implementation of environmentally sustainable practices across the non-league pyramid has been slow, a growing awareness has been exhibited.

Economic initiatives

Source: Authors own, 2025.

Figure 12. A list of contributions to economic sustainability by interviewed clubs.

As depicted in Figure.12, current economic initiatives span from unconventional sponsorship to alternative revenue streams (Bjelkanovic, 2020). This exhibits a subtle volta in the financial landscape of non-league football (Villarino, 2021), transitioning away from traditional revenue sources such as gate receipts and local sponsorships towards diversified, external funding models. For example, the varied revenue generation strategies reported by clubs, such as facility rentals and unique sponsorship deals, demonstrate a level of innovation and adaptability that has not been documented in existing literature. Similarly, traditional sponsorship deals described by Hindmarsh (2020) as local businesses or wealthy individuals were often supplemented by innovative approaches, including Real Bedford's partnership with cryptocurrency companies. This suggests that non-league clubs may be more adaptable to emerging trends than previously suggested (Irving, 2023). Moreover, diversification of revenue sources was a common theme across all clubs, as:

> *"You're trying to diversify yourself away from Match Day revenue, because you don't want to be solely dependent on what happens on Saturday at three o'clock...we do happy hours before and after*

the games...you want to keep them [the fans] there for as long as you possibly can...you're trying to maximise your match day revenue" (Participant C).

This necessity to transition beyond traditional reliance on matchday revenue is exemplified by clubs ground sharing, including Bedfont who have shared its ground with both Spartans Youth and British Airways in the past. This practice has become a vital source of revenue outside of matchdays (May and Parnell, 2016), permitting clubs to use their facilities year-round. Such partnerships not only ensure continuous income but also establish connections with local communities (ibid). Analogously, every club (n = 12) rents their clubhouse out for wakes, parties and related events. These efforts align with findings from other studies, emphasising the requirement for clubs to use their facilities creatively (Mabon, 2020). Above all, grants and external funding remain critical to the financial sustainability of non-league clubs. While this study did not extensively explore grant funding, many clubs continue to rely on these resources to support infrastructure and community projects (Bingham, 2012). For instance, Abbey Rangers have applied for a £20,000 grant from the Heathrow Community Trust to invest in youth programmes, ensuring long-term sustainability and providing opportunities for future generations to engage in the sport. Ultimately, diversifying revenue streams is paramount for reducing reliance on bi-weekly facility usage, ensuring economic sustainability. While grants and funding can offer valuable support, they should not be viewed as a primary or consistent income stream.

Social initiatives

Source: Authors own, 2025.

Figure 13. A list of contributions to social sustainability by interviewed clubs.

Prominent in Figure.13, social sustainability efforts, particularly in community engagement and youth development were notable across every interviewed club (n = 12). This coincides with the traditional assertion that non-league clubs are community hubs (Porter, 2019). In fact, (n = 4) clubs actively engage with local schools, offering free tickets and organising mascot packages and fun days, to boost attendance. Additionally, creative engagement efforts, such as designer kit competitions for school children have successfully increased community interest and matchday attendance at Deal Town. Homogenously, youth development is a focal point for all teams, with clubs running extensive boys' and girls' teams, disability

football programs, and walking football for older individuals. This is strongly buttressed by one participant who stated,

> *"We've got 45 boys' teams...20 girls' teams...100 people regularly doing walking football, men and women...it is a community hub." (Participant C).*

Likewise, a couple of clubs have partnered with local schools to provide facilities for teaching, utilising football, as an important driver of popular culture (Mabon, 2023). This pattern is consistent with previous literature, which identifies that the primary goal of clubs' social actions are to collaborate with local associations and promote social inclusion for vulnerable groups (Villarino, 2021, p.3). This is further supplemented by Real Bedford's hardship fund, which provides financial assistance to ensure that all children, regardless of their economic background, can participate in football activities. In summary, while current literature highlights the connection between clubs and local communities, it must be noted that clubs hold an advantageous position to be an advocate for sustainability, because of the close affiliation communities have with their teams (Loewen and Wicker, 2021).

Recommendations

Financial Interventions

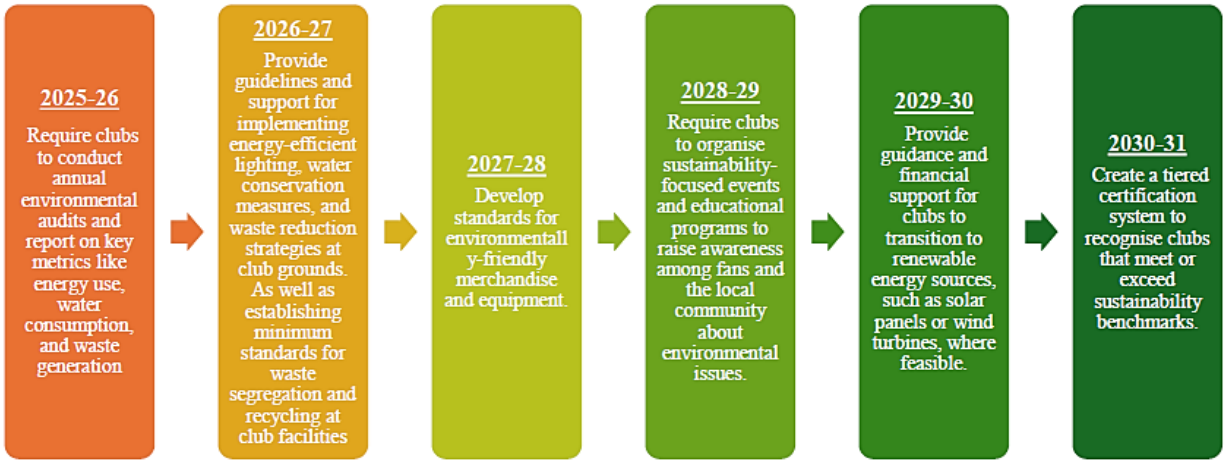
Connecting directly to research objective three, introducing financial interventions such as targeted grants, tax incentives, and sponsorships specifically designed for sustainability could alleviate economic pressures, encouraging non-league teams to become more sustainable. This concept is consistent with Khanna et al. (2024) who imply that more attractive economic initiatives valuing greenhouse gas emissions or implementing a carbon tax will reduce emissions. Correspondingly, as fans and consumers alike are paying increased attention to brands and companies social and ethical behaviour (Villarino, 2021) clubs could discover a niche, attracting more fans, growing economically. Respectively, clubs must persist in diversifying their revenue beyond match days. By using existing infrastructure for no football activities including community and corporate events, clubs can mitigate their financial risks and generate a consistent revenue flow (Öner, et al., 2024). Furthermore, strengthening relations with local businesses and educational institutions by providing tailored sponsorship packages and exposure on social media (Supporters Direct, 2011) can increase brand awareness and financial backing. Finally, the adoption of financial metrics is crucial for long term viability. Introducing financial tools like the S-Score (Evans, 2018) can assist clubs in monitoring financial health, evaluate revenue diversification, and make data-driven decisions, fostering long-term growth.

Regulatory support and policy interventions

With the biggest barrier for implementing sustainable initiatives identified as weak governance, improved regulatory support from governing bodies is mandatory to establish clear frameworks and foster a culture of responsibility within the sport. Without coherent regulatory guidelines, non-league clubs are left to navigate sustainability on their own, resulting in inconsistent practices and a lack of strategic direction. To address this issue, governing bodies such as the FA must take a proactive role in providing guidance and introducing sustainability regulations for clubs at all levels. Perhaps this could include mandatory reporting on energy consumption, and waste management. As noted by one participant:

> *"It should be regulated. It has to come from government. It has to be a top-down thing... I know that there's a push back on extra regulations, extra red tape, but you're not going to make meaningful change unless you actually mandate it." (Participant K)*

This strongly represents the consensus among the other stakeholders, that sustainable initiatives must be mandated rather than voluntary. While some clubs may resist additional regulations, without regulatory intervention, meaningful progress towards sustainability will remain limited (Melia-Jones, 2020). Contrarywise, there is some promise as Participant J highlights, "*We have a growing relationship with our local council now, and they're supporting sport more...we've seen funding pots that are available with the local council*." While this is an isolated example, by providing funding and outlining sustainability targets, local councils can provide incentives for clubs that demonstrate significant improvements, while also holding those that fail to comply accountable. Additionally, a sustainability league table or accreditation (Khanna et al, 2024), as evidenced by elite football leagues, could encourage clubs to become more sustainable. This would not only foster competition (Melia-Jones, 2020) but also encourage clubs to adopt best practices, leading to overall improvements across the sport. In summary, Figure.14 depicts a potential roadmap for improved governance and regulation of sustainability within non-league football. The process begins with initial audits and progresses through to sustainable certification and ongoing regulation:



Source: Authors own, 2025.

Figure14. A potential roadmap for improving sustainability governance and regulations in non-league football.

Education and awareness

Education and awareness campaigns targeted at club leadership could help shift cultural perceptions of sustainability (Stephenson, 2023). While club committees are often rigid and entrenched in historical practices (Herrfahrdt-Pähle et al., 2020), the volta towards sustainable practices must be illuminated. As mentioned, a key challenge identified in the research is the lack of knowledge on sustainability among stakeholders, with one participant noting, "*If we could go to somebody who's been dealing in football clubs on these issues and get best practice, that would be superb*" (Participant K). This accentuates that clubs could benefit from a top down approach that includes providing resources such as lists of trusted builders, accountants, and consultants who specialise in sustainability. In addition to educating club leadership, it is crucial to extend education efforts to fans and volunteers. Raising awareness among supporters regarding the importance of sustainability can aid a more environmentally and socially responsible fan culture (Kraft, Bühren and Wicker, 2025). This could include campaigns to promote eco-friendly practices and support initiatives that foster inclusivity and community engagement (Hernández-Hernández, Londoño-Pineda and Cano, 2024). To a similar extent, educating volunteers and enhancing recruitment would provide clubs with the human resources required to drive sustainability initiatives. By providing sustainability orientated workshops and training, clubs can equip fans, volunteers and stakeholders with the necessary knowledge to

reduce their environmental impact and promote social responsibility both within and beyond the footballing community.

Project limitations

While the methodology chapter aforenoted several constraints, it is essential to acknowledge the limitations of this study and their potential impact on the results. One primary limitation is the relatively small sample size (n = 12) and regional bias. Although efforts were made to include a northern club to mitigate bias and reduce the study's carbon footprint, future research should expand the sample size and incorporate a more geographically diverse pool. Equally, providing the vast number of non-league clubs, a significantly larger sample was impractical within this study's scope. However, the number of interviews aligns with previous research (Baldwin, 2010 and Carmichael, 2020), reinforcing validity of the approach. Furthermore, nonresponse bias (Gratton and Jones, 2010) is another constraint, as despite multiple follow-up attempts, some stakeholders did not respond, potentially skewing results by excluding perspectives from participants less conscious of sustainability. Regarding analysis, NVivo ensured a structured approach to identifying key themes. Conversely, as reinforced by Braun and Clarke (2022), thematic analysis inherently involves a degree of subjectivity, as the interpretation of themes may be influenced by the researcher's perspective. Therefore, a mixed methods approach incorporating quantitative analysis, such as surveys could have provided additional validation to the findings. Equivalently, investigating specific clubs could have offered a more dynamic comprehension of sustainability challenges and practices over time but would've taken up considerable time beyond this study's means. Moreover, unconscious bias was perhaps an issue as subtle verbal and non-verbal cues, such as nodding, may have influenced responses (Gratton and Jones, 2010). Though, efforts were made to conduct interviews objectively and allowed participants to speak freely without excessive prompting. Likewise, stadia observations could've been more structured, using a checklist, permitting consistent evaluation of key sustainability factors such as energy efficiency, waste management and water usage. Despite these limitations, this study provides valuable insights, providing a foundation for future research.

Future research

Future research should build upon these findings by investigating cost-effective sustainability practices for resource constrained clubs and conduct comparative regional or international analysis. Thus, identifying underlying geographical patterns and best practices of sustainability. To a similar extent, it would be beneficial to interview governing bodies such as the FA and the Football Foundation, given their critical roles in shaping football policy and funding, despite their previous decision to decline comment. Besides, future studies should perform quantitative analysis to evaluate the effectiveness of sustainable initiatives across a larger sample of clubs. Likewise, investigations into fan attitudes and demographic factors influencing perceptions towards sustainability employing netnography (Fenton, Keegan and Parry, 2021) could offer valuable insights into key motivators, enhancing the effectiveness of sustainability campaigns.

CONCLUSION

This study marks the first known scholarly attempt to critically examine sustainability within a non-league context across England. The results obtained have several implications for practice and policy, as more pressure and accountability should be positioned upon the governing bodies to implement legislation. Casting analytical attention on sustainability in nonleague football, this research draws focus on the often-overlooked efforts and challenges faced by non-league clubs, elevating their profile. In doing so, this study has exposed deep-rooted, elitist structures embedded within football, which establish ingrained disparities in sustainability efforts. Through a combination of interviews and observational analysis, it is apparent that while some clubs

demonstrate a commitment to sustainability, their initiatives are constrained by financial limitations and a lack of governance. These findings reveal a narrow comprehension of sustainability among stakeholders, aligning with existing literature. Similarly, while the study corroborates literature highlighting financial barriers, it juxtaposes dominant narratives by showcasing the strong emphasis on social sustainability within nonleague football. This affirms that, despite systemic challenges and neglect from the media, these clubs remain vital community cornerstones. Ultimately, this research has successfully answered its aims by exploring sustainability challenges and opportunities within non-league football in the South of England. While contributing to the limited but emerging literature on this topic, it emphasises the necessity for further exploration, particularly regarding governance that could facilitate sustainable development. Respectively, future research should extend beyond regional analysis, examining non-league sustainability on a national scale, assessing the role of fan engagement in fostering long-term ecological and financial sustainability. Overall, this study has demonstrated that non-league clubs are adopting sustainable practices and with the appropriate support, they can become catalysts for positive change.

SUPPORTING AGENCIES

No funding agencies were reported by the author.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author.

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to everyone who has supported me throughout this project. First, I would like to thank my supervisor Professor Simon Kemp and Personal Academic Tutor Professor Peter Sunley for their invaluable feedback and support. Their expertise and guidance were instrumental in the completion of this project. Additionally, I am grateful to the School of Geography and Environmental Science at the University of Southampton for providing the necessary resources and environment that facilitated my work. I would also like to extend my heartfelt thanks to my family and friends for their constant encouragement and belief in me. Finally, I'd like to acknowledge the clubs and participants in my research. Without their cooperation and willingness to share their insights, this project would not have been possible.

REFERENCES

Al-Ababneh, M.M. (2020). 'Linking Ontology, Epistemology and Research Methodology' Science & Philosophy, 8(1), pp.75-91. https://doi.org/10.23756/sp.v8i1.500

Amann, J. and Doidge, M. (2023). 'I Hadn't Realised That Change Is Not a Difficult Thing': Mobilising Football Fans on Climate Change. Sociology, 57(6). https://doi.org/10.1177/00380385221142211

Andrews, M. and Harrington, P. (2016). 'Off Pitch: Football's Financial Integrity Weaknesses, and How to Strengthen Them'. https://doi.org/10.2139/ssrn.2746644

Association, T.F. (2024). Ground grading. www.thefa.com. Available at: https://www.thefa.com/get-involved/player/ground-grading. [Accessed 12 Dec.2024].

Association, T.F. (2017). The National League System Structure. www.thefa.com. Available at: https://www.thefa.com/get-involved/player/the-national-league-system. [Accessed 18 Nov.2024].

Association, T.F. (2020). A statement on the Black Lives Matter campaign in football. www.thefa.com. Available at: https://www.thefa.com/news/2020/jun/30/football-unitesagainst-racism-300620. [Accessed 19 Oct. 2024].

Azungah, T. (2018). Qualitative research: 'Deductive and Inductive Approaches to Data Analysis'. Qualitative Research Journal, 18(4), pp.383-400. https://doi.org/10.1108/QRJ-D-18-00035

Baldwin, R. (2010). Football and climate change: strange bedfellows or a means of going beyond the usual suspects in encouraging pro-environmental behavioural change? Local Environment, 15(9-10), pp.851-866. https://doi.org/10.1080/13549839.2010.531252

Barisaux, M., Gasselin, P., Laurens, L. and Ollivier, G. (2024). Why and how to conduct a Scoping Review of literature in the Humanities and Social Sciences? Application to free labour in agriculture. Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique, 162(1), pp.212-242. https://doi.org/10.1177/07591063241236069

Bingham, T. (2012). Birkbeck Institutional Research Online. Bbk.ac.uk. Available at: https://eprints.bbk.ac.uk/id/eprint/7617/1/7617.pdf. [Accessed 12 Dec.2024].

Bello, D. (2020). Cost Reduction and Sustainable Business Practices; A conceptual approach. Journal of Economics and Administrative Sciences, 26(118), pp.78-87. https://doi.org/10.33095/jeas.v26i118.1862

Bjelkanovic, B. (2020). Global politics and Sport : Positioning of the football club as a global actor inspired by global agendas of sustainable development; Case study of Malmö FF. Available at: https://www.diva-portal.org/smash/get/diva2:1476643/FULLTEXT02 [Accessed 06 Feb. 2025].

Braun, V. and Clarke, V. (2022). Conceptual and design thinking for thematic analysis. Qualitative Psychology, 9(1), pp.3-26. https://doi.org/10.1037/qup0000196

Bury, J. (2015). Non-performing inclusion: A critique of the English Football Association's Action Plan on homophobia in football. International Review for the Sociology of Sport, 50(2), pp.211-226. https://doi.org/10.1177/1012690213479789

Carmichael, A. (2020). The organisation of community football, a barrier to environmental change. Managing Sport and Leisure, 28(2), pp.1-15. https://doi.org/10.1080/23750472.2020.1865189

Casper, J. (2017). Is Going Green Worth It? Assessing Fan Engagement and Perceptions of Athletic Department Environmental Efforts. Journal of Applied Sport Management. https://doi.org/10.18666/JASM-2017-V9-I1-7690

Cleland, J., Doidge, M., Millward, P. and Widdop, P. (2018). Friendships, Community Ties, and Non-league Fandom: Opting 'Out' from the Commercialization of the Premier League and 'In' to Leftist Political Scenes. Springer eBooks, pp.65-87. https://doi.org/10.1007/978-3-319-73141-4_3

Collins, A. and Flynn, A. (2008). Measuring the Environmental Sustainability of a Major Sporting Event: A Case Study of the FA Cup Final. Tourism Economics, [online] 14(4), pp.751-768. https://doi.org/10.5367/000000008786440120

Costello, C., McGarvey, R. and Birisci, E. (2017). Achieving Sustainability beyond Zero Waste: A Case Study from a College Football Stadium. Sustainability, 9(7), p.1236. https://doi.org/10.3390/su9071236

Cuskelly, G., Hoye, R. and Auld, C. (2006). Working with Volunteers in Sport. Routledge. https://doi.org/10.4324/9780203966822

Delia, E.B., McCullough, B.P. and Dalal, K. (2024). Team Identity and Environmentalism: The Case of Forest Green Rovers. Journal of sport management, 38(5), pp.1-12. https://doi.org/10.1123/jsm.2023-0269

Dimitrios Kolyperas (2012). Corporate and Social Responsibility in Professional Football Club Organizations. Academia.edu.

Doidge, M., Claus, R., Gabler, J., Irving, R., Millward, P. and Silvério, J. (2019). The impact of international football events on local, national and transnational fan cultures: a critical overview. Soccer & Society, 20(5), pp.711-720. https://doi.org/10.1080/14660970.2019.1616264

Dowling, R. (2005). Power, subjectivity and ethics in qualitative research. Qualitative research methods in human geography, (2), pp.19-29. Available at: https://researchers.mq.edu.au/en/publications/power-subjectivity-and-ethics-in-qualitativeresearch-2 [Accessed 19 Oct. 2024].

Draper, C. (2009). 'Role of qualitative research in exercise science and sportsmedicine'. Sabinet African Journals. Available at: https://journals.co.za/doi/abs/10.10520/EJC67024. [Accessed 13 Dec. 2024].

Evans, R. (2024). The S-Score of Financial Sustainability for Professional Football Clubs. Journal of Sports Economics, 25(3). https://doi.org/10.1177/15270025231222634

Fenton, A., Keegan, B.J. and Parry, K.D. (2021). Understanding Sporting Social Media Brand Communities, Place and Social Capital: A Netnography of Football Fans. Communication & Sport, 11(2), p.216747952098614. https://doi.org/10.1177/2167479520986149

Fernández-Villarino, R. (2021). Sustainability in the football industry: An approach to the gap between theoretical formulation and practical application, through the results of the social fair play project. Heliyon, 7(6), p.e07318. https://doi.org/10.1016/j.heliyon.2021.e07318

FIFA (2021). The football landscape - The Vision 2020-2023. FIFA Publications. Available at: https://publications.fifa.com/en/vision-report-2021/the-football-landscape/. [Accessed 14 Dec. 2024].

Flowerdew, R. (2008). Methods in Human Geography. Routledge. https://doi.org/10.4324/9781315837277

Football For Future (2024). Football Sustainability Charity. Football For Future. Available at: https://footballforfuture.org/. [Accessed 08 Oct. 2024].

Gleason, T.O. (2023). No More Empty Stadiums: A Meta Analysis of Mega Sporting Events and Their Economic Impact. USD RED. Available at: https://red.library.usd.edu/honorsthesis/288/. [Accessed 19 Dec. 2024].

Graham, J., Trendafilova, S. and Ziakas, V. (2018). Environmental sustainability and sport management education: bridging the gaps. Managing Sport and Leisure, 23(4-6), pp.422-433. https://doi.org/10.1080/23750472.2018.1530069

Gratton, C. and Jones, I. (2010). Research methods for sports studies. Available at: https://repository.bbg.ac.id/bitstream/575/1/Research_Methods_for_Sports_Studies.pdf. [Accessed 23 Sep. 2024].

Hanan Alhaddi (2015). Triple Bottom Line and Sustainability: A Literature Review. https://doi.org/10.11114/bms.v1i2.752

Henn, S., Miggelbrink, J. and Hörschelmann, K. (2021). Research Ethics in Human Geography. Routledge eBooks. Routledge. https://doi.org/10.4324/9780429507366

Hernández-Hernández, J.A., Londoño-Pineda, A. and Cano, J.A. (2024). Understanding fan pressures and its impact on football club sustainability: insights from the Colombian context. Frontiers in Sports and Active Living, 6. https://doi.org/10.3389/fspor.2024.1508164

Herrfahrdt-Pähle, E., Schlüter, M., Olsson, P., Folke, C., Gelcich, S. and Pahl-Wostl, C. (2020). Sustainability transformations: socio-political shocks as opportunities for governance transitions. Global Environmental Change, 63, p.102097. https://doi.org/10.1016/j.gloenvcha.2020.102097

Hindmarsh, M. (2020). Sponsorship in Grassroots Football. Available at: https://researchonline.ljmu.ac.uk/id/eprint/13899/1/2020hindmarshphd.pdf. [Accessed 13 Dec. 2024].

Ingholt, O. and Jørgensen, T. (2023). The Kingdom of Saudi Arabia's use of sports as a legitimation strategy. Available at: https://research-api.cbs.dk/ws/portalfiles/portal/98727537/1556633_Masters_Thesis_Contract_Number_30206.pdf. [Accessed 23 Nov. 2024].

IPCC (2021). Climate Change in Data: The Physical Science Basis. Available at: https://www.ipcc.ch/. Available at: https://www.ipcc.ch/report/ar6/wg1/resources/climatechange-in-data/. [Accessed 23 Sep. 2024].

Irving, R. (2023). Sustainability in football: the community ownership model. eprints.bbk.ac.uk. Available at: https://eprints.bbk.ac.uk/id/eprint/50900/. [Accessed 19 Oct.2024].

Isgren, E. and Longo, S.B. (2024). Social sustainability: more confusion than clarity. Journal of Environmental Studies and Sciences, 14(5). https://doi.org/10.1007/s13412-024-00978-2

İsmail Öner, Özgür Karataş and Emine Öztürk Karataş (2024). Financial sustainability in football clubs. Mustafa Kemal Üniversitesi Eğitim Fakültesi Dergisi, 8(14). https://doi.org/10.56677/mkuefder.1575336

Juan Alejandro Hernández-Hernández, Allec, A., José Alejandro Cano and Rodrigo Andrés Gómez-Montoya (2023). Stakeholder governance and sustainability in football: A bibliometric analysis. Heliyon, 9(8), pp.e18942-e18942. https://doi.org/10.1016/j.heliyon.2023.e18942

Kalinowski, P., Kluj, O. and Jerszyński, D. (2020). A prominent footballer as a role model for young athletes. Quality in Sport, [online] 6(4), pp.30-37. https://doi.org/10.12775/QS.2020.024

Khan, S. (2014). Qualitative Research Method: Grounded Theory. https://doi.org/10.5539/ijbm.v9n11p224

Khanna, M., Tiberio Daddi, Merlo, F. and Fabio Iraldo (2024). An Assessment on the Carbon Footprint of a Football Club-an Action Research from Theory to Practice. Circular Economy and Sustainability, 4. https://doi.org/10.1007/s43615-024-00350-0

Knox, S. and Burkard, A.W. (2009). Qualitative research interviews. Psychotherapy Research, 19(4-5), pp.566-575. https://doi.org/10.1080/10503300802702105

Koutrou, N. and Kohe, G.Z. (2021). Conceptualising landscapes of learning in the United Kingdom's volunteer football sector. Sport, Education and Society, pp.1-16. https://doi.org/10.1080/13573322.2020.1850437

Kraft, C., Bühren, C. and Wicker, P. (2025). The carbon footprint of football fans: Emotional and rational correlates of home and away game travel. Environmental and Sustainability Indicators, 26, p.100635. https://doi.org/10.1016/j.indic.2025.100635

Limna, P. (2023). The impact of NVivo in qualitative research: Perspectives from graduate students. Journal of Applied Learning & Teaching, 6(2). https://doi.org/10.37074/jalt.2023.6.2.17

Loewen, C. and Wicker, P. (2021). Travelling to Bundesliga matches: the carbon footprint of football fans. Journal of Sport & Tourism, 25(3), pp.253-272. https://doi.org/10.1080/14775085.2021.1932562

Longhurst, R. (2003). Semi-structured Interviews and Focus Groups. https://doi.org/10.4135/9781036233679.n10

Luca Marrucci, Tiberio Daddi and Fabio Iraldo (2023). Sustainable Football. Taylor & Francis. https://doi.org/10.4324/9781003228271

Mabon, L. (2022). Football and climate change: what do we know, and what is needed for an evidence-informed response? Climate Policy, [online] 23(3), pp.1-15. https://doi.org/10.1080/14693062.2022.2147895

Maguire, K. and Philippou, C. (2023). Research report: Still ill? Assessing the financial sustainability of football (2023). [online] GOV.UK. Available at: https://www.gov.uk/government/publications/reforming-club-football-governanceconsultation-response/research-report-still-ill-assessing-the-financial-sustainability-offootball-2023. [Accessed 23 Nov. 2024].

May, A. and Parnell, D. (2016). The community impact of football pitches: a case study of Maidstone United FC. Sport in Society, 20(2), pp.244-257. https://doi.org/10.1080/17430437.2016.1173921

McCullough, B.P. (2013). Identifying the influences on sport spectator recycling behaviours using the theory of planned behaviour. International Journal of Sport Management and Marketing, 14(1/2/3/4), p.146. https://doi.org/10.1504/IJSMM.2013.060631

McNamee, M., Olivier, S.L. and Wainwright, P. (2006). Research Ethics in Exercise, Health and Sports Sciences. Routledge. https://doi.org/10.4324/9780203966853

Melia-Jones, J. (2020). Environmental Fair Play: An emerging concept to improve the sustainability performance of football clubs?

Medjralou.A. Zaoui, A. (2022). 'The role of football in promoting the goals of sustainable development' (Qatar World Cup 2022).

Membrillo-Hernández, J., Lara-Prieto, V. and Caratozzolo, P. (2021). Sustainability: A Public Policy, a Concept, or a Competence? Efforts on the Implementation of Sustainability as a Transversal Competence throughout Higher Education Programs. Sustainability, 13(24), p.13989. https://doi.org/10.3390/su132413989

Miller, K. (2021). Pledgeball Goes From Strength to Strength! - Whitehawk FC. [online] Whitehawk FC. Available at: https://whitehawkfc.com/pledgeball-goes-from-strength-tostrength/ [Accessed 25 Feb. 2025].

Miller, T. (2017).Greenwashing Sport. Routledge. https://doi.org/10.4324/9781315659244

Nichols, G. (2024). Explaining a decline in volunteering in the UK. Voluntary Sector Review, pp.1-6. https://doi.org/10.1332/20408056Y2024D000000023

Nichols, G., Knight, C., Mirfin-Boukouris, H., Uri, C. and Storr, R. (2016). Motivations of Sport Volunteers in England A review for Sport England. [online] https://doi.org/10.13140/RG.2.2.16975.28323

Nosratabadi, S., Mosavi, A., Shamshirband, S., Kazimieras Zavadskas, E., Rakotonirainy, A. and Chau, K.W. (2019). Sustainable Business Models: A Review. Sustainability, 11(6), p.1663. https://doi.org/10.3390/su11061663

Nowell, L.S., Norris, J.M., White, D.E. and Moules, N.J. (2017). Thematic analysis: Striving to Meet the Trustworthiness Criteria. International Journal of Qualitative Methods, [online] 16(1), pp.1-13. https://doi.org/10.1177/1609406917733847

Nufer, G. and Nufer, I. (2024). The Case of the Soccer World Cup 2022 in Qatar and Sustainability: Comparison of FIFA's Plan (Target) and Public Perception (Actual).https://doi.org/10.33642/ijbass.v10n1p3

International journal of business and applied social science, 10(1), pp.29-35. https://doi.org/10.33642/ijbass.v10n1p3

O'Gorman, J. (2015). Introduction: developing the research agenda in junior and youth grassroots football culture. Soccer & Society, 17(6), pp.793-799. https://doi.org/10.1080/14660970.2015.1100895

Pache, G. (2020). Sustainability Challenges in Professional Football: The Destructive Effects of the Society of the Spectacle. Journal of Sustainable Development, 13(1), p.85. https://doi.org/10.5539/jsd.v13n1p85

Papić, A. (2022). Declining numbers of volunteers in the sport sector EVIS. Evisproject.eu. Available at: https://evisproject.eu/declining-numbers-of-volunteers-in-the-sport-sector/ [Accessed 01 Mar. 2025].

Pierce, J. and Lawhon, M. (2015). Walking as Method: Toward Methodological Forthrightness and Comparability in Urban Geographical Research. The Professional Geographer, 67(4), pp.655-662. https://doi.org/10.1080/00330124.2015.1059401

Plumley, D., Ramchandani, G.M. and Wilson, R. (2018). The unintended consequence of Financial Fair Play. Sport, Business and Management: An International Journal, 9(2). https://doi.org/10.1108/SBM-03-2018-0025

Qu, S.Q. and Dumay, J. (2011). The Qualitative Research Interview. Qualitative Research in Accounting & Management, 8(3), pp.238-264. https://doi.org/10.1108/11766091111162070

Sabanoglu, T. (2019). Topic: Second-hand retail in the United Kingdom (UK).

Statista.com. Available at: https://www.statista.com/topics/4593/second-hand-retail-inthe-united-kingdom-uk/. [Accessed 19 Dec. 2024].

Saldana, J. (2022). The Coding Manual for Qualitative Researchers. SAGE Publications Ltd. Available at: https://uk.sagepub.com/en-gb/eur/the-coding-manual-for-qualitativeresearchers/book273583 [Accessed 23 Nov. 2024].

Sanders, A., Heys, B., Ravenscroft, N. and Burdsey, D. (2012). Making a difference: the power of football in the community. Soccer & Society, 15(3), pp.411-429. https://doi.org/10.1080/14660970.2012.692675

Saunders, B., Kitzinger, J. and Kitzinger, C. (2015). Anonymising Interview data: Challenges and Compromise in Practice. Qualitative Research, 15(5), pp.616-632. https://doi.org/10.1177/1468794114550439

Scotson, T. (2022). Why is non-league more popular after the pandemic? [online] Mancunian Matters. Available at: https://www.mancunianmatters.co.uk/sport/17012022-why-is-nonleague-more-popular-after-the-pandemic/. [Accessed 06 Jan. 2025].

Scottish FA (2024). Environmental sustainability in Scottish football welcome contents. Available at: https://www.scottishfa.co.uk/media/5953/scottish-faenviro-sustainability-in-scottish-football.pdf [Accessed 05 Dec. 2024].

Shao, G. (2024). Aligning buzzword trends of sustainability with true sustainable development. International Journal of Sustainable Development & World Ecology, 68, pp.1-2. https://doi.org/10.1080/13504509.2024.2412821

Sharma, G. (2017). Pros and Cons of Different Sampling Techniques. International Journal of Applied Research, 3(7), pp.749-752. Available at: https://www.allresearchjournal.com/archives/2017/vol3issue7/PartK/3-7-69-542.pdf [Accessed 26 Nov. 2024].

Sky Sports News (2020). PFA survey shows players wish to continue taking a knee despite some fans booing the anti-racism gesture. [online] Sky Sports. Available at: https://www.skysports.com/football/news/11095/12165892/pfa-survey-shows-players-wishto-continue-taking-a-knee-despite-some-fans-booing-the-anti-racism-gesture [Accessed 12 Oct. 2024].

Stephenson, J. (2023). Culture and Sustainability. Springer eBooks. https://doi.org/10.1007/978-3-031-25515-1

Stonewall (2022). Rainbow Laces: New research showing British public overwhelmingly…. [online] Stonewall. Available at: https://www.stonewall.org.uk/news/rainbow-laces-new-research-showing-british-public-overwhelmingly-support-lgbtq-people [Accessed 26 Feb. 2025].

Supporters Direct Scotland (2011). Business Advantages of Supporter Community Ownership 1. Available at: https://thefsa.org.uk/wp-content/uploads/2020/10/Briefing-Paper-4.pdf. [Accessed 02 Nov. 2024].

Todaro, N.M., McCullough, B. and Daddi, T. (2022). Stimulating the adoption of green practices by professional football organisations: a focus on stakeholders' pressures and expected benefits. Sport Management Review, 26(1), pp.1-25. https://doi.org/10.1080/14413523.2022.2046971

Tóffano Pereira, R.P., Filimonau, V. and Ribeiro, G.M. (2019). Score a goal for climate: Assessing the carbon footprint of travel patterns of the English Premier League clubs. Journal of Cleaner Production, 227, pp.167-177. https://doi.org/10.1016/j.jclepro.2019.04.138

United Nations (1987). Sustainability. United Nations. Available at: https://www.un.org/en/academic-impact/sustainability. [Accessed 19 Sep. 2024].

United Nations (2018). Secretary-General's remarks on Climate Change [as delivered]. United Nations Secretary-General. Available at: https://www.un.org/sg/en/content/sg/statement/2018-09-10/secretary-generals-remarksclimate-change-delivered. [Accessed 07 Jan. 2024].

United Nations (2023). - SDG Indicators. unstats.un.org. Available at: https://unstats.un.org/sdgs/report/2023/Goal-13/. [Accessed 11 Dec. 2024].

United Nations (2024). The Paris Agreement. [online] United Nations. Available at: https://www.un.org/en/climatechange/paris-agreement. [Accessed 20 Dec. 2024].

United Nations Climate Change (2020). Creating the Greenest Football Club in the World - Forest Green Rovers | United Kingdom. Unfccc.int. Available at: https://unfccc.int/climateaction/momentum-for-change/climate-neutral-now/creating-the-greenest-football-club-in-theworld-forest-green-rovers. [Accessed 19 Sep. 2024].

Vaismoradi, M., Jones, J., Turunen, H. and Snelgrove, S. (2016). Theme Development in Qualitative Content Analysis and Thematic Analysis. Journal of Nursing Education and Practice, 6(5), pp.100-110. Available at: https://nordopen.nord.no/nordxmlui/bitstream/handle/11250/2386408/Vaismoradi.pdf?seque. [Accessed 19 Nov. 2024].

Vaughan, A. (2018). Arsenal Leads Charge into Battery Power at Emirates Stadium. The Guardian. Available at: https://www.theguardian.com/business/2018/nov/26/arsenal-batterypower-emirates-stadium [Accessed 13 Nov. 2024].

Ward, S. and Hines, A. (2017). The demise of the members' association ownership model in German professional football. Managing Sport and Leisure, 22(5), pp.358-373. https://doi.org/10.1080/23750472.2018.1451359

Werner, T. (2023). Green Goals on the Pitch: Unveiling the Driving Forces Behind Sustainability Strategies in German Professional Football Clubs A Case Study on TSG 1899 Hoffenheim and FC St. Pauli. Available at: https://essay.utwente.nl/96244/1/Werner_BA_BMS.pdf. [Accessed 24 Sep. 2024].

Wilson, R., Ramchandani, G. and Plumley, D. (2018). Mind the gap: an analysis of competitive balance in the English Football League system. International Journal of Sport Management and Marketing, 18(5), p.357. https://doi.org/10.1504/IJSMM.2018.10014485

Zhou, G., Gu, Y., Wu, Y., Gong, Y., Mu, X., Han, H. and Chang, T. (2020). A systematic review of the deposit-refund system for beverage packaging: Operating mode, key parameter and development trend. Journal of Cleaner Production, 251, p.119660. https://doi.org/10.1016/j.jclepro.2019.119660

Zülch, H., Cruz, J. and Kirsch, B. (2021). How Is Sustainability Concerning ESG Considered and Assessed in German Professional Football? Available at: https://opus.bszbw.de/hhlpd/frontdoor/deliver/index/docId/2827/file/HHL195.pdf. [Accessed 20 Dec. 2024].

APPENDICES

APPENDIX A – ERGO ETHICS APPROVAL OBTAINED: 22 07 2024

APPENDIX B – PARTICIPANT RECRUITMENT EMAIL

Dear Sir/Madam,

I hope this email finds you well. I am currently conducting a research study on sustainability practices within non-league football as part of my degree at the University of Southampton.

The purpose of this study is to explore practices, challenges, and opportunities for enhancing sustainability in non-league football. I believe football is a powerful catalyst for change, and your valuable experience and insights in the field would be incredibly beneficial to this research.

I would like to invite you to participate in a semi-structured interview. Your participation does not require your club to have active sustainability initiatives in place, as this study also aims to raise awareness and highlight challenges in the field.

Details of the Interview:

- Duration: Approximately 30-40 minutes.
- Format: Preferably in-person (video call option available).
- Date and Time: At your convenience.
- Location: Preferably a football related facility (stadium).

If you agree to participate, please let me know your availability between now and the end of September.

Thank you for your time and considering this request. Please feel free to reply if you have any questions or need further information.

Kind regards.

APPENDIX C – PARTICIPANT INFORMATION SHEET

Study Title: Assessing the sustainability of non-league football clubs in England.

ERGO number: 95249

You are being invited to take part in the above research study. To help you decide whether you would like to take part or not, it is important that you understand why the research is being done and what it will involve. Please read the information below carefully and ask questions if anything is not clear or you would like more information before you decide to take part in this research. You may like to discuss it with others, but it is up to you to decide whether or not to take part. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

This research is part of a student project completed as part of an undergraduate degree in Geography at the University of Southampton. As a passionate football fan and a concerned environmentalist, I am deeply invested in exploring how non-league football clubs in England can contribute to sustainability. I believe that by giving non-league clubs, which are often overlooked in the media, a voice, they have the potential to become vehicles for positive change. Therefore, I will be asking a series of questions relating to sustainability including themes of food and transport. Thus, enabling a deeper understanding on potential areas for improvement. The expected outcome of this research includes non-league clubs facing several barriers to implementing sustainable practices including financial, geographical and socio-political constraints.

Why have I been asked to participate?

You have been approached to participate in this study due to your involvement with a non-league football club. Your insights and experiences are invaluable as they will contribute to a deeper understanding of the sustainability practices and challenges faced by your club. The research aims to include approximately 12 participants to ensure a diverse range of perspectives are represented. Your participation is paramount as it will help highlight the specific financial, geographical, and sociopolitical constraints that non-league clubs encounter when trying to implement sustainable practices. By understanding your experiences and perspectives, this research can provide practical recommendations and raise awareness about the potential of non-league football clubs becoming more sustainable.

What will happen to me if I take part?

Participation in this study is not mandatory, However, if you decide to take part, you will be expected to participate in a semi-structured interview, either in person at your club or via video call, lasting approximately 40 minutes. During the interview, you will be asked questions related to various aspects of sustainability, including food, transport and waste management at your club. The interview will be audio-recorded to enable accurate analysis of the information you provide. These recordings will be transcribed and deleted following the conclusion of the project. The information you provide can be anonymised upon request. Additionally, there are no compulsory follow-up activities unless you express an interest in being updated on the final publication of the research. Whereby, you will be provided with a summary of the findings. Furthermore, the research project is expected to last several months, but your direct involvement will be limited to a single interview. Your participation is entirely voluntary, and you can choose to withdraw up to 30 days after the interview has been conducted.

Are there any benefits in my taking part?
While there will be no direct benefits to you personally, your participation will contribute to a wider understanding of sustainability challenges faced by football clubs. Similarly, your participation may inform future policies and initiatives in this topical area of study. Additionally, your club may receive publicity on a small scale if the project is successful.

Are there any risks involved?
This research involves minimal risks. While there are no physical risks, you may feel some discomfort when discussing financial or operational difficulties your club may face. If you feel distressed at any time, the interview will be terminated and you are free to skip any questions you prefer not to answer. Additionally, there is a risk of your opinions being taken out of context or causing offense to supporters, sponsors, or others with conflicting views. To mitigate this, you may request to anonymise your answers. Whereby full names and personal information will be replaced with pseudonyms. Furthermore, a comprehensive risk assessment has been conducted to ensure your safety throughout the study.

What data will be collected?
Data collected for this research will focus on gathering qualitative insights regarding sustainability practices, challenges, and perspectives from you regarding your football club. Personal information such as your name and contact details will also be collected solely for the purpose of follow-up and communication, if requested. The data will be obtained through a semi-structured interview conducted either in person or via video call. The interview will be audio-recorded to ensure accuracy in capturing your responses. Additionally, observations will be recorded related to sustainability practices within the stadium , if permitted on the consent form. All collected data, including interview recordings and personal information, will be stored securely on a password-protected OneDrive. To ensure safety, personal data will be separated from non-identifiable information and restricted access will be implemented to maintain confidentiality.

Will my participation be confidential?
Recorded personal data will be separated from non-identifiable data, and all information will be published according to the anonymity preference selected on the consent form. Audio recordings will be stored on a secure device and transcribed, then destroyed upon receiving my mark and graduating from university. Your participation and the information collected about you during the research will be kept strictly confidential. Only the researcher and responsible members of the University of Southampton may be given access to data about you for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All of these people have a duty to keep your information, as a research participant, strictly confidential. Additionally, all data, including consent forms, will be securely stored. Electronic data will be encrypted and password-protected behind a personal OneDrive, while physical documents, including signed consent forms, will be kept in locked cabinets accessible only to authorised personnel. For sustainability, participants will be offered the option to sign a digital copy instead of a printed one.

Do I have to take part?
No, you do not have to take part, participation in the research is entirely voluntary. It is your decision whether you wish to take part. If you choose to participate, you will be required to sign a consent form indicating your agreement.

What happens if I change my mind?
If you decide to change your mind and withdraw from the study, you may do so. You have the right to request the withdrawal of your data up to 30 days after the interview without giving a reason. After this period, your data will be retained for the purposes of completing the study objectives, in accordance with GDPR exemptions for research purposes.

What will happen to the results of the research?
The results of the research will be handled with confidentiality, ensuring that your personal details are kept according to the anonymity preference selected on the consent form. The project findings will be written up in my dissertation, which may be published in academic journals or presented at conferences. Similarly, you will receive a summary of findings if requested on the consent form.

For further information, or if you wish to file a complaint, you can contact me at: **** or my supervisor: ****

What happens if there is a problem:
If you have a concern about any aspect of this study, you should speak to the researcher who will do their best to answer your questions. If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Head Research Ethics and Governance (023 8059 5058, rgoinfo@soton.ac.uk).

Data Protection Privacy Notice

How will the information about you be used?
For the purposes of data protection law, the University of Southampton is the 'Data Controller' for this study, we will need to use information from you for this research project.

This information will include your name and contact details. People will use this information to do the research or to check your records to make sure that the research is being done properly. We will keep all information about you safe and secure.

Once we have finished the study, we will keep some of the data so we can check the results. We will write our reports in a way that no-one can work out that you took part in the study.

What are your choices about how your information is used?
- You can stop being part of the study at any time, without giving a reason, but we will keep all anonymous information about you that we already have.
- We need to manage your records in specific ways for the research to be reliable. This means that we won't be able to let you see or change the data we hold about you.

Where can you find out more about how your information is used?
You can find out more about how we use your information:
- By sending an email to University's Data Protection Officer (data.protection@soton.ac.uk).
- By asking one of the research team or from our general privacy policy.

Thank you for taking the time to read the information sheet and for considering participating in the research.

APPENDIX D – CONSENT FORM

Study Title**:** Assessing the sustainability of non-league football clubs in England.

Ethics ERGO number: 95249

Version and date: V1.0, 10 06 24

Thank you for your interest in this study. It is very important to us to conduct our studies in line with ethics principles, and this Consent Form asks you to confirm if you agree to take part in the above study. Please carefully consider the statements below and add your initials and signature only if you agree to participate in this research and understand what this will mean for you.

Mandatory Statements: Please add your initials in the boxes below if you agree with the statements:

Mandatory Consent Statements	**Participant Initials**
I confirm that I have read the Participant Information Sheet version 1.0, dated 06/06/24 explaining the study and I understand what is expected of me.	
I confirm that I have been given the opportunity to consider the information, ask questions about the study, and all my questions have been answered to my satisfaction.	
I agree to take part in this study and understand that data collected during this research project will be used for the purpose of this study.	
I understand that my participation is voluntary and that I am free to withdraw from this study at any time without giving a reason.	

Additional Statements: Please add your initials in the boxes below if you agree with the statements:

Additional Consent Statements	**Participant Initials**
Section: Audio Video Recordings and Transcripts	
I understand that taking part in this study involves audio recording. I am happy for my interview to be audio recorded and understand that the audio recording will immediately be deleted once the final transcription has been checked and completed.	
I understand that I can skip or refuse to answer any question(s) without any consequences.	
Section: Withdrawal of data	
I understand that I can withdraw my data from the use in this study within 30 days following my participation.	
Section: Sharing of data and future use	
I understand that all personal information collected about me (e.g., my name and contact details) will be kept confidential (i.e., will not be shared beyond the researcher) unless required by law or relevant regulations (e.g., for the purpose of monitoring the safety of this study).	
Section: Participation prior to the project conclusion	
I understand that my personal data will be kept until the conclusion of the project and that I can or ask for them to be removed prior to this at any time by contacting: ****@soton.ac.uk	
I would like to be contacted following the publication of the project detailing a summary of the findings.	

Anonymity preference: Please add your initials in the box below regarding your personal and club anonymity in this research:

Section: Anonymity preference Personal
Full Anonymity: My identity and responses will remain completely anonymous. No identifying information will be linked to my responses. Instead, pseudonyms such as 'Participant A' should be used.
Partial Anonymity: Some identifying information may be collected, but my full identity will not be disclosed in any publications. My first name and gender can be used.
No Anonymity: I agree to be identified by name in publications and reports based on this study.

Section: Anonymity preference Club
Full Anonymity: The club's identity and responses will remain completely anonymous. No identifiable information will be published. Instead, pseudonyms such as 'Club A' will be used.
No Anonymity: The club agrees to be identified by name in publications based on this study.

Name of participant	**Signature**	**Date**
Name of person taking consent	**Signature**	**Date**

*Once this Consent Form has been signed by all parties, a copy of the signed and dated form should be provided to the study participant. Original signed copy should be stored in the study site file (If applicable).

APPENDIX E - INTERVIEW PLAN

Personal Introduction:

Interviewer: The purpose of this study is to raise awareness of sustainability in non-league football and by giving non-league clubs, which are often overlooked in the media, a voice, they have the potential to become catalysts for positive change.
Interviewer: Is there anything you would not like to talk about before we start this interview?
Interviewer: Just to let you know, I'll be recording and transcribing this interview.
Interviewer: To start, could you please tell me a bit about yourself, your role, and how you became involved with the club?
Interviewer: So, I have some standardised questions to ask which focus on environmental, economic and social sustainability, so feel free to answer as you see fit, whether it's a simple yes, no or with more detail.

Evaluating Current Sustainability Practices:

Interviewer: What does sustainability in football mean to you?

- If it helps, I see sustainability as encompassing environmental, economic, and social dimensions within the sport. To be maintained at a manageable level.

Interviewer: How important is sustainability to you personally, and how does it align with the club's values?
Interviewer: How important is implementing sustainable practices at the club?
Interviewer: Can you describe any sustainable initiatives that the club has implemented?
Interviewer: What are the main challenges the club faces in implementing sustainable practices?
Interviewer: Are there any ways that the club has reduced its environmental impact? (including waste management, energy use and water consumption).
Interviewer: Do you and or the club wish to be more sustainable?

Economic Sustainability:

Interviewer: What are the main financial challenges the club faces in maintaining economic sustainability?
Interviewer: How do you make the club more sustainable on non-match days? i.e. renting the clubhouse/ facilities etc.?
Interviewer: How does this impact your budget and financial planning?
Interviewer: Does your club engage in fundraising or sponsorship efforts specifically related to sustainability?

Social Sustainability:

Interviewer: How does the club engage with the local community to promote sustainability?
Interviewer: How do you involve different stakeholders, such as fans, sponsors, and local businesses, in your sustainability efforts? What feedback have you received from them?

Measuring Impact:

Interviewer: How does the club measure the impact of its sustainability practices? Are there specific metrics or indicators you use to assess progress?
Interviewer: Does the club have to adhere to any regulations or standards set out by the FA regarding sustainability? such as FFP etc.?

Proposing Recommendations:

Interviewer: Based on your club's experience, what recommendations would you give to other non- league football clubs looking to improve their sustainability?
Interviewer: Are there any resources or partnerships that have been particularly helpful for your club's sustainability efforts?

Collaboration and Support:

Interviewer: Have you collaborated with other clubs or organisations on sustainability projects?
Interviewer: What kind of support, whether financial, advisory, or technical, would be most beneficial for enhancing the club's sustainability?
Interviewer: Has there been any support either financial advisory etc. from the league or the FA?

Future Plans:

Interviewer: Do you have any future plans to implement additional sustainable practices?
Interviewer: Are your club's off-field future goals related to sustainability?

Ground-Related:

Interviewer: What measures has the club implemented to ensure that the pitches are maintained in a sustainable way?

Merchandise and Greenwashing:

Interviewer: Have you taken steps to ensure that your merchandise is produced sustainably?
Interviewer: How do you avoid "*greenwashing*" in your club's sustainability communications?

Closing:

Interviewer: Is there anything else you'd like to ask, discuss or share with me that we haven't covered?
Interviewer: Thank you so much for your time and good luck with the rest of the season.

APPENDIX F – NVIVO CODEBOOK

Name	Description	Files	References
Awareness	The level of comprehension and knowledge regarding sustainability.	5	13
Sustainability definition	How sustainability is perceived and defined by non-league club stakeholders.	11	30
Barriers for implementation	Challenges preventing the adoption of sustainability measures.	11	88
Engagement	The extent to which clubs, fans, and stakeholders participate in sustainability initiatives and promote best practices.	7	22
Environmental sustainability	Efforts to reduce the club's environmental footprint.	11	79
Waste management and recycling	Strategies for managing waste effectively.	8	21
Financial sustainability	Ensuring the club's long-term financial viability through responsible budgeting, revenue diversification, and cost-effective operations.	12	79
Non-Match Day revenue	Income generated from activities outside match days, such as venue hire, events, and community programs.	11	51
Sponsorship and Partnerships	Collaborations with businesses, organisations, and brands to support club sustainability.	12	59
Future planning	Long-term strategies or proposals aimed at ensuring the sustainability of non-league clubs.	6	14
Geographical challenges	Location-based difficulties that affect sustainability efforts, such as transport accessibility, rural vs. urban constraints, and local environmental factors.	7	22
Governance	The role of leadership and policies in implementing sustainable practices within the sport.	12	67
FA and League support	The influence and assistance provided by governing bodies in promoting sustainability within non-league football.	12	85
Greenwashing	The comprehension of misleading stakeholders by falsely portraying a club's sustainability efforts as more substantial or effective than they truly are.	4	10
Infrastructure	The sustainability of club facilities.	8	27
Pitch	The environmental impact and sustainability measures related to pitch maintenance, including the use of natural vs. artificial turf, water usage, and eco-friendly treatments.	7	21
Merchandise	The sustainability of club-branded products, considering factors such as ethical sourcing, materials used, and recycling initiatives.	10	22
Food and drink	The sustainability of food and beverage offerings at the club, including local sourcing, waste reduction, and eco-friendly packaging.	5	9
Social sustainability	Community engagement, inclusivity, and social responsibility initiatives by the club.	12	88
Education	Initiatives aimed at increasing awareness and knowledge regarding sustainability among players, staff, supporters and the wider community.	6	17
Volunteers	The role of volunteers in supporting sustainability and wider initiatives within the club.	8	20
Sustainability indicators	Metrics and benchmarks used to measure and assess sustainability performance.	8	18
Transport	Sustainable travel options for players, staff, and fans, including carpooling initiatives, and reducing the carbon footprint of travel.	4	9

APPENDIX G – TRANSCRIPT EXAMPLE:

All other transcripts are available on request.

Nick Riley (Participant G) meeting recording:

Date: 31/10/2024
Region: Surrey, Abbey Rangers, Addlestone Moor.
Anonymised: No
Role: Chairman

Interviewer 00:01
So can you tell me a bit about yourself, your role, and how you became involved in Abbey Rangers?

Interviewee 00:08
I'm the chairman. Nick Riley, Chairman of Abbey Rangers, started down here 17 years ago, got my son down to play football when he was about five. Got asked if I could help put some cones out one evening, and then ended up being a coach, then ended up being a manager, managed teams from under sevens all the way through to the under 23 development squad. Ended up on the committee, then ended up as vice chairman, with the chairman saying you won't have to do anything, just turn up at some Cup finals. And then he stepped down, and then I ended up as chairman. So it's a real passion. I love football. I love I love the community aspect of Abbey, and I really like the youth aspect as well, because I think we're as much life skills coaches out there, as we are football coaches. If you can get kids on the right path early, then it's a lot easier than trying to rehabilitate or getting get on the right path later.

Interviewer 01:13
So, I have some standardised questions. Feel free to say yes, no or add more detail where you want.
What does sustainability and football mean to you?

Interviewee 01:23
Wow, it's a big question. Sustainability doesn't, doesn't finish or end anywhere. For me, it's, it's part of everything that we should all be doing. It crosses so many factors. Obviously, when people think of sustainability, you think of energy, and you think of plastics as well. Obviously, you know, I was out there when you turned up, just turning the water on the pitch, thinking that's not a great advert for sustainability. Although I drive it forwards, the club as a whole, very much shares my values and philosophies. For me, sustainability at Abbey, or anything at Abbey, it's a conduit for how we can we can teach, guide and lead our children how to move forwards. There's some bits I want to start talking to you about as we go through this about recycling. That's a huge aspect down here, but it's about everything that we teach down here. One of our core values at Abbey Rangers is respect, and that obviously goes to teammates. It goes to officials. It goes to parents, opposition, and it goes to the environment as well. So we don't expect kids to leave litter, we don't expect them to, you know, when the pitches are soft and muddy, we don't expect them to smash them up before or after the game. It's a lot of sort of respect. So I think that's where sustainability comes in. And one of the things we'll be talking is the financial aspect of it. So for me, sustainability, it's often got an upfront investment, but then with back end, but you've got to have, or find that upfront investment, both in funds and in time. So I think that's a really broad aspect to it, but it ties in with the values and philosophies of Abbey Rangers.

Interviewer 03:27
And I saw you recently donated your old goal posts?

Interviewee 03:30
Yes, so you're following us. So again, the circular economy, as I'm sure you know, re-engineering things. You know, it's going massively forwards, whether it's especially with things like mobile phones. You know, I haven't bought a new mobile phone for a couple of times. Now, I get the refurbished ones purely because we're just going to, you know, I don't want to start getting too preaching, but the planet is going to run out of important minerals and resources soon. And as a grassroots Football Club, we have often repurposed things coming into the club where, what I call you may be a bit young for this, but the Wombles, which you to look it up, they just recycled and repurposed everything. So our first flood lights came off the M 25 we didn't steal them off the M 25 it's when they were doing works years, decades ago. There they had temporary lighting. One of our committee members then got into a conversation with the construction team, and they were taking them down, saying, Where are you going with those? I think they were being ditched. And they said, Look, we're buying all the beer and set them up at Abbey Rangers. That was our first set of flood lights. So we're very used to receiving, yeah, I call it recycled, repurposed goods, and then we look to do it as well. So we've got a really good, growing relationship with our local council now, and they're supporting sport more. All partly because I've held their toes to the fire and told them that we've just been awarded sports club of the Year by Runnymede for 2024 with a lot of the work that we're doing down here. So yeah, to be able to recycle, repurpose going forwards is huge for us as well. And again, as I said in the post, it just takes a change of mindset, a bit of effort up front, and it can then be done. And I mean those goal posts brand new, are just under £6000 pounds, so they needed a bit of TLC, but that's probably the best part of maybe £3000/£4000 pounds of value. We just gave to Runnymede that will go, you know, so it's going to save them money. They can spend that money on other services. And again, it's kids over local parks that can, that can, that can use them as well.

Interviewer 05:49
So, you've got that initiative. Have you got any more that you've implemented to reduce environmental impact, waste management, water consumption, etc?

Interviewee 06:00
No. Water consumption is very difficult. You know, every year we put a lot of investment, time and money into our pitches, and it's guaranteed, if ever you want to have a barbecue or a UK holiday, just give me a call and ask when I'm putting £13,000 pounds worth of grass seed down, because it won't rain for about two, three weeks. So we have to get water out onto the pitch. We are looking at whether we can get, we've got a big water tank, whether we can get a water but to take rainwater off the roof. There's lots of things we're looking at, but there's not much that we're doing at the moment, but it's coming.

Interviewer 06:47
So, do you wish to be more sustainable?

Interviewee 06:48
100% , so you want me to talk about some of the projects now that we've got that we're looking at. So some of the main things we've got down here is water usage, and obviously power usage, particularly through our flood lights. That's the main source of power, not yet, because, again, we installed those ages ago, and we need to get them upgraded, and that's 10s of 1000s of pounds, and I'll come on to grants in a bit as well. We sat at this very table, actually, probably about a year and a half ago, and had a really long conversation with

a with a really good company, one of our sponsors as well, called Power Core, about solar panels on the roof here. But the whole problem, then, is storage of the power, because we can collect the power during the day, but we've got minimal use for it during the day, so we need to store it to then use it at night, when we turn the flood lights on. Then you're bringing in the aspect of batteries, which is a lot of money and a lot of space, and that technology still doesn't quite seem to be there yet. So you've then got to store it. You obviously lose a lot of power as well once you transfer it into a battery, and then the battery back to when you need it again. It just didn't financially or logistically make sense. Another thing I've looked at, but again, I've heard of it more than seen it is on the top of flood lights. You can actually get small turbines to help run them almost as a wind turbine, but again, that people talking to me about it, rather than seeing the technology. At the moment, one of the big bug bears of mine has been single use plastic, and that is massively prevalent in this club, because in this clubhouse, we can serve all our drinks in glass, but as soon as you step outside, you can take glass onto the terrace. As soon as you go pitch side, it's FA rules. You can't take glass out there, so we serve everything in the single use plastic we've been toying again for maybe a year for the multi-use plastic. And I have just basically made an announcement to the clubhouse that single use plastic is now banned. We're not ordering anymore. I've got two companies that have given me quotes for the multi-use plastic. One through our Brewery, which is Heineken, and another one through a contact that I know. Again, it's about, I think it's about £1000 pounds to get these sort of cups in. Yeah, we've got some here already, which we've trialled, branded as Abbey Rangers, which looks good. We've then got to figure out a way of how to get them back, because a lot of people may still put them in a bin. So do we do a deposit scheme on them, where you know your first pint is an extra pound, but when you bring the cup back, or you take it, you either keep it, but it's extra money, or you come back. They do it at the oval, at the cricket. So lots of places that do it, because, again, it's just slight, and I know that if you do that, all the kids will be out there collecting the cups, bringing them back in for us. So we just got to figure that out. The big thing that we just done, is we changed at the beginning of this year our waste collection company from Grundons, big, big, huge business. Then So Green came in, and I do favour local small businesses. They've just got that extra edge to them. And the UK economy, the backbone of the UK economy is small businesses, all you ever hear about is the big corporates, but it's the corner shops and the window cleaners, they're the backbone of the UK economy, So Green are literally over the fence there. They've come in, made us some great offers about what they want to do, and they want to get involved in the community. They want to get involved in Abbey Rangers. They have now become our first team shirt sponsor as well. You won't see it today. The shirts are still just getting printed up, but they do recycle as well as waste collection. And we sat down, and again, what I really liked about them is they sat down and said, tell me about Abbey Rangers, tell me about the dynamics, the rhythm, how it works, etc. And we've done really well. So we've got all the main big bins outside. So we've got general waste and then recycling as well. And they are going to help us monitor all the data, the how many tips we do, how many cubic litres, etc. The problem we've got now is I just put bins out there. And even if I put a grey bin and a green bin, it just it's not really going to work. People will just mix the rubbish up. So we need to go bigger, and we need to go properly on it, and I've spent a lot of time. And I'm really interested because, again, there's Formula One says they're going to be carbon neutral by heart of belief, 2035. They're going to be carbon neutral. But again, they do, they do some bits around, you know, Again, it's just the bin stations, one for recycling, and we're speaking with So Green as well. We can just put all our recycling in one so I've just applied to the Heathrow Community Trust, because we're within Runnymede, so we've got planes flying over us. So Heathrow always want to invest in community projects. So I've just applied to them for a grant, a large grant. It's £20,000 pounds, but Abbey Rangers will put 10% in towards that. Well, I've applied for bins, but that's the big thing, because there's what we've done with So Green has been fantastic, but I just need to and this is where we're talking about the education aspect. With these bins, as you've seen, they're going to be really properly built. They're going to be on proper stands, etc. Some will be fixed outside, we can have a quick look at the grounds in a bit if you want. Some will be fixed. Some will be mobile. We'll have them in the

clubhouse as well. You can have signage around them so it'll be very clear. What's recycling, what's waste. You just got to make things simple for people visible, simple, I lift the lid up, I put it in. It's done. When the bins full, we can just open it, wheel the bin out, empty it in the right bin, put it back. That's simple. What we can also then do is sell advertising around a bit as well so people can be proud sponsors. Yeah, we've got our, you know, Billy Bob's whatever, you know, proud supporter of the environment at Abbey Rangers, and you start getting that really great community tie in. One of the things I have noticed, is that, oh no, I'll say it's about 50/50, the kids often aren't the worst. The adults are sometimes the worst as well. So again, if I can get that new generation coming through, it's just eliminating single use plastics, because what we see a lot of out there, as well as people will bring the Lucozade bottles and drink those. So another thing we want to start doing, and we're seldom at cost, is selling Abby Rangers bottles here that they can then use loads of times. And I'm also looking at getting a water refill station. Because at the moment, if you come in and ask here, can you fill my water bottle up the bar, the bar staff will do it. No problem. Of course, the kid walks in and it's busy. On a Sunday, we'll have 25 games. We'll have 800,000 people through the club. They think, oh, it's easy, if I just buy a bottle of and also, of course, water is a lot better than these sugary Lucozade drinks that they get as well. So if I can get a couple of hydration stations out there, where it's good water, they can just fill their bottles up. That's what I'm looking to do. And that will almost a tick next to our recycling bit, because, again, through data, what we look to do is, obviously, minimise landfill waste, maximise recycling. What we then look to do is keep that landfill waste number low and start reducing our recycling as well as we start getting rid of more and more single use plastic. And do that, and it's something we don't get the kids that much here. Schools get them, you know, whatever it is, six, seven hours a day, five days a week, we get them for an hour and a half mid-week training, and maybe a couple of hours on a Sunday when they play. But dare I say, kids, maybe sometimes, aren't that fond of school. They love football. They love Abbey Rangers, that way, we bring in people like the first team. We've got a fantastic first team here. Play a good level with ninth tier, eight promotions away from the Premier League, we start getting them promoting, you know, don't use, don't drink this, you know, Ribena thing, and I'm taking revenue away from the clubhouse. You know, use fill up your water, but all the kids will be like, I want to follow some forward at Abbey. So there's a good there's a good vehicle that we can do for that. Then it's LED flood lights out there.

Interviewer 17:13
So you mentioned economics, obviously a massive challenge. But what other challenges do you face in implementing sustainable initiatives?

Interviewee 17:22
It is finance, really. I say it's finance and time. But again, we're a big club. We've got 51 teams down here, so about seven 800 players and just over 2000 members. So out of those 2000 members, we've got doctors, lawyers, accountants, advertising, electricians, plumbers. We've got the lot, yeah, and we've got people that have said, Oh, we can help with you know, I run projects for sustainability, or I run projects for integrated LED lighting, etc. So I'm not saying they'd be the best, but we've got this great resource that we can tap into on it, but it's the two biggest obstacles for us is money we run. The club is really well run financially, and we run it almost as two halves. So we've got the membership and the football side, so everything that the people pay for their little Jimmy to play football every week, goes into providing football services. We've then got sponsorship and the clubhouse and everything else that produces revenue that we can then put into other projects. So we do it separately, because I don't want someone's money for their son to play football, to go into a first team budget, or the car park or something. I like to keep it separate, and if we then want to have a go fund me page or something, you know, or an initiative to get funds in. But the projects I'm looking at like, I say, the recycling waste station. That's 20,000 pounds. The flood lights. I'd have thought would be, I'd have thought that's the best part of 50 grand. And out of these you can get, you never get full funding. You go

through the Football Foundation. I've got great relationship with them, on first name terms with them, and the Premier League stadia fund, normally get between about 50 to 70% Yeah. So if you're working on something like led flood lighting, you're still going to be sat with a good 20 grand, you know, bill or something. And you've got to sell a lot of chicken nuggets to make 20 grands worth of profit out of that. So that's that, and it's getting we've got a good structure here. We've got the executive committee that really we're the ones that look at tomorrow all the time. So we're the ones that are looking at Sustainability and Environment, basically the whole three year plan where we want to be as a football club through everything from where do we want our kids to be, where do we want our football development to be? Where, you know what we want to do. We want to change this clubhouse, Sustainability, Environment, sponsorship, all of that. We've then got the main committee that do the pitch allocations, training, sort of run the day to day club. And then we've got a fantastic sort of subgroup, which is all these brilliant helpers, but we just need more people around that, particularly with some big projects. I've got a managers meeting on Monday, and one of the things I'm going to say to them about is start talking to your teams about getting more helpers for projects. So it's still very much a volunteer run club. You know, yeah, exactly we, you know, on a Sunday you come down, there'll be parents out there doing litter picks, car park duties, helping serve here. So volunteerism is getting more and more difficult.

Interviewee 18:45
On a non-match day, how are you sustainable? Would you rent the clubhouse, pitches etc?

Interviewee 20:57
Yeah, it's difficult. We've got a 3g pitch up there, which, again, we're the management company for, but we share it with the school, so we have all the financial responsibility of that. We do as many external hires as possible. But with 51 teams down here, there's not a lot of availability. The girls are fantastic at doing events here. This is the most, most multi-purpose room I've ever seen. I've seen it look like an enchanted garden, a casino, you know, all sorts or just a 40th birthday party. And we're raised funds through there. So we look to monetise this as much as possible, but we also give it away for free a lot to causes like we have Chertsey High School. We have their disadvantaged children come in during the week for special teaching. We've got a special needs school there. We let them use our facilities a lot, because, again, if I'm looking to monetise something, I'm going to get that money and then put it towards community use. So I might as well just, if it's a community use that wants it, I might as well just give it to them for free.

Interviewer 22:10
How does the club engage in the local community?

Interviewee 22:13
Yeah, we still need to engage more. There's a lot more that we need to do. We've got the local fire station next door. They've become members. They come in and have drinks, and they'll be in to watch the game today. But we're a bit of a sleeping giant here. Our biggest strength is our resources, everything that we've got, yeah, and our values and philosophies. Our biggest weakness is that we're the area's best known secret. So yeah, people will walk in and go, I mean, people that come to a game and say, Have you got car parking? Have you got toilets? They think we're over the local wreck. Then they come in and go, you've got an actual you've got a proper setup here. So we got to get our marketing better around that. Yeah, across everything as well. I mean, it's great that you've seen that we've donated that stuff to Runnymede, the goal post. And, of course, there's no such thing as a selfless deed, you know. I was doing it because I wanted to get the message out there about, you know, think before you throw things away, someone else can pick that up as well. That's brilliant, you know. But again, it's self-interest. I want to get the brand name and awareness out

there. I just had an extension built at home, and the builder would put things out at the front of the driveway. And a lot of people get arise about that. And it's the normal, dare I say, country cousins, that come and collect it. But much before that, that it goes in the skip into a landfill, we've got to start repurposing things more.

Interviewer 23:43
You mentioned your analytics. How do you measure the impact of either your initiatives or your environmental impact?

Interviewee 23:53
So we're still at nascent stages of that. So with our recycling, we know how much everything just goes into general waste, or we've got bins out there that says recycling, but everything general waste is put in there. So as soon as I get these new bins put up, I'll be able to, I'll get data from so green on a you know, they provide it, you know, weekly, if we want, because they do two tips, two collections a week, and they'll be able to start providing us data on and the landfill, how much landfill waste we're, you know, we're getting rid of, and how much recycling as well. So we'll be able to monitor that. Let's say the next big thing will then be electricity and flood light usage. Say, water. I haven't quite looked at yet, because it's only as a, you know, sort of June, July, that we use a lot of water the rest of the time. We're trying to get it off the pitch, not on the pitch, so that they'd be the power will be the next one. But until I can get sight of how we could afford LED lighting, or some kind of sustainable lighting, I need a grant, but I also need sponsorship on that. That's we just can't raise that much money. When I say cost of living is going up, we've got, we've got some of the cheapest membership rates in the area. I'm under a lot of pressure to increase it, but I'm also seeing increased hardship cases from the local community. And again, you know that's we do it two ways. I don't want to start top skimming memberships to start paying for environmental things down here.

Interviewer 25:41
Does the club have to adhere to any regulations or standards set out by the FA or governing bodies for sustainability?

Interviewee 25:49
I don't think there's not for sustainability. That's all off our own back and what we want to do. So the FA you also got a lot of ground grading, you know, health and safety, you know, everything like that. They're all over us. So when you look at something like the flood lights, yeah, they do a lux or, you know, lux test on it, just to make sure, you know, there's no dark spots in any area of the pitches. And of course, we got floodlit 3g as well. So that's not ground graded, but we still do the Lux tests on those. But yeah, for sustainability, no, we're left on our own. So you know, if there was regulation coming in, brilliant, but as a club, we would never look at statutory or FA regulation as the benchmark. You know, if it was there, is there. But we've got our own ideas and philosophies of what we want to do. One of the clubs I really admire, I say I admire them. I bought into Dale Vince years ago, Forest Green Rovers. So when I was I used to work for a ground transportation company, a chauffeur drive company, and so this would have been 20 years ago. He just started Ecotricity then. So we moved our electricity over to Ecotricity. We went to carbon neutral. I started putting something called one water in our cars, which is all of their water, all their profits goes to water aid in Africa. So Forest Green Rovers, so I would love to be known as one of the best environmentally sustainable clubs outside of the EFL. That's my objective. It's very difficult to sit down and say, I know what we need to do. Like I say, - 8 - you know, I can map it out, but it's very difficult to say this year we'll do recycling. Next year, we'll do you know, power and electricity. The year after that, we can look at water. It's very much finance and time dependent, because we're all volunteers there, and we're all working 30,40, 50 hours a week to pay the

mortgage and, you know, at home and put food on the table, and in our spare hours, we're down here, but, yeah, something like Forest Green Rovers, absolutely, that's an objective.

Interviewer 28:39
Based on your and your club's experience, what recommendations would you give to other non-League clubs looking to improve their sustainability?

Interviewee 28:54
Stop talking about it and get it done like I say, I turn around to our two club house managers. You know, we've had, we've had sample cups in of the multi-use plastics since before the tournament, and our tournament was May, so yeah, maybe the best part of six months we've had those cups in. But there's always a reason to not do something. And one of those main reasons is just what you do day to day. Anyway, we're all busy doing the day to day stuff to, you know, focus on today and tomorrow to tomorrow, but you can run out tomorrows pretty quickly. So sometimes you need someone to, you know, grab the ball by the horns and say, Enough. And I said to them, there's no more. You're not ordering single use plastic. Again, I've made the decision you've got about, you know, six weeks' worth of it here. So you've got six weeks to get these other cups in. Yeah. So it's just sort of, you know, stop procrastinating. Stop procrastinating and get it done. Yeah, and it doesn't matter if it's a small win, get a win on the board, because a lot of these things, you know, if you can get a couple of small wins on the board, you may get someone else interested in it, and then you can get a little bit, you know, if you get that momentum, momentum is a massive thing in sports, a massive thing in life. Absolutely, so start with a couple of small, small little, quick wins somewhere, and go from there. But I get it, it's for other clubs. Looking at it, it's easy to have the ideas and think, Oh, it's just that next step. Just pick something, one thing, get it done. Make a decision and get it done. Get good people around you.

Interviewer 30:40
What kind of support financial advisory would be most beneficial to the club for enhancing sustainability?

Interviewee 30:58
I mean, there is, I'd say there is things out there, I think, as we've said, for me, it is, it's finance, and it's time and again, I found a lot of people that are help advise me on things. I mean, I'm a chartered accountant. I run businesses and help run businesses for years, so I've got to, I'm not an expert on everything, but I've got a pretty good steer on what to do, what needs doing. It's very much finding someone that will say, Nick, I'll come in and help you deliver this. I'll give you, you know, it's a four - 9 - month project. I can give you two, three hours a week, and let's get, let's get this project done. You and I own it, and we get it done. That would be heaven for me. 31:38 Has there been any support from the league or the FA at all? Interviewee 31:41 No, no, I wouldn't say. I wouldn't say I've really seen support from them again. I'm on really close first name terms with Surrey FA, their ex Chairman's a real good friend and part of Abbey Rangers when all of their initiatives are mainly around football for all safeguarding, Rainbow laces, you know, the whole sort of more the personal aspect, rather than, you know, respects and pieces and quiet Sundays and that sort of it. You don't really see anything from them around sustainability or around finances. It's kind of a rail that they want to steer away from. Again, if it was, you know, I'm on really good terms with the with the local council. And, I mean, they always have these online teams sports forums, and we all go on there, and it's football clubs, cricket clubs, netball, hockey, all of us. But I said to them, Look, teams doesn't work. I'll host the next one. Have it down here. Shot my mouth off. They said, brilliant. Abby Rangers is hosting it. I was like, Oh, crap. And we had it here, and it was fantastic. And they said, they said, Oh, we've got to have them in person more, because we have our business forums in person, and they work really well. And I said, bring me to your next business forum. I want to, I want to connect. Because I said, there will be people there that are like, I'd much rather

give my sponsorship money to you than just put it like the praying spray, and I'll put it in the local I say the local newspaper, they don't exist, but Surrey live or something like that. So it's, it's that connectivity that I need. I don't need someone just advising me. I need someone that can say, I can introduce you to 50 local businesspeople. Two of them may turn around and say, I'd love to get I'd love to get on side with Abbey Rangers. I'd love to be associated with you. I've got a modest budget here. Because, again, the first thing I'll say is, tell me about your business. Tell me what you're looking for. And some of them may be, we actually create waste, or we create we're not good for the environment or something. So I'm like, Jesus come on board with us. We've got this old sustainability bit, and you can sit there and say, we're helping Abbey Rangers do this, and it will sort of balance out sort of thing. So what, what I need is not advisory. It's people that can help me do it, or people that can help me say, I can help you get this money in to do it. We're really happy to put our hands in our back pocket. We work really hard, but we can't find 20 grand to do something. We can find two, three five, then we can get a grant, but then we've still got that, yeah, that bit that's missing.

Interviewer 34:36
So you mentioned the non-disposable cups. Have you taken any other steps for the merchandise, or want to be more sustainable?

Interviewee 34:46
We've got these (cups) used to be plastic, so we've got we've got that. So when you mean merchandise, you just mean anything else, Interviewer 34:53 Yes, t shirt, the shirts, or anything from the club. Interviewee 34:58 No, but I know where you're going with the whole, the shirts are made from recycled plastics, or shirts or something, because I know a lot of clubs are doing that now. No, we haven't I got to admit, at the moment, on things like shirts, we don't do a lot of we do all the club kits. One of our first team players sat there, so everyone's sort of kitted out, and that's very much about what prior, I mean, that is where I go. I say, lazy, what price can I get the kit in for? And also, we pick a supplier. So we're with Joma at the moment. I've probably got Kappa here. And again, it's what pressure can you then put on a kit supplier to say, start, you know, getting, you know, better, on recycled materials or something. And one of the things we look at as well is, you know, it's the whole marketing piece, because you look at something that you could say, I mean, again, when I worked in ground transportation, hybrid cars were all the range. Everyone wanted, oh, we've got to give us a hybrid Lexus. But when you looked at it, and you looked at the cradle to grave on it, you know, the Mercedes was actually a far better car for the environment. So there's, there's a lot of misconceptions around things here. And what is the cost? What's the environmental cost of re of getting old plastics and repurposing them into a shirt, because you can sit there and say, Oh, electric cars have got 0, effect on the environment. Hang on a minute, because it's fossil fuels that are creating electricity, plus all of the batteries and everything there, you know, all of the minerals that are having to go into those batteries. There's obviously huge supply chain issues around that. Where are those cars coming from? Are you better to get local? It does get confusing, which is where I like to try and simplify things as much as possible.

Interviewer 36:54
How does the club avoid greenwashing?

Interviewee 37:01
Well, Grundon has promised me the earth with it, but, yeah, look, there's how do we avoid it? We're not really in that space at the moment, to be honest, with people coming in and promising things with that sort of green wash, like I say, we look to and it's actually a secondary, or maybe even a tertiary aspect of it, we look to use a lot of local people, a lot of local suppliers, but that's because we're a local community football club. So instead of going to the massive company that will be bringing stuff in on the trucks where get the local

deliveries and everything coming in. So that's the sort of secondary aspect of it that, you know, instead of someone driving here from Southampton, you know, - 11 - they're coming, they're coming from, you know, two miles away. But yeah, if the question were, how would we stop greenwashing. I don't suffer fools lightly. If someone's coming in waving an environmental or sustainable flag in front of me, I'd want to see actual data or justifiable What are you actually doing? Not just we're an environmental business, or we've recycled this or something. And again, I'm talking about all this fantastic recycling we're doing, and it's going out there and so green and picking it up. Where's that going? I don't know. So you can only do this is an old thing, if you, if you start looking at the big picture, too much easy to sit down and go, I'm not doing anything. Yeah, do what you do. And think I've done my bit in the chain. Hopefully other people are as well. And again, in business, I've seen it before where, you know, the procurement teams turn around and start saying, You've got to be a sustainable business, you've got to be minority owned, you've got to have all these things. And you just end up thinking, What are you doing? Where are you going with this? You know, we look at getting the best people in that can do the job, and that will be several aspects that will be finance, reputation, quality of what they do, deliverability, sustainability comes into that. So it's one of those key aspects. But I wouldn't be looking at someone just giving some empty words, if they're saying they're sustainable, show me how.

Interviewer 39:26
Is there anything else you'd like to discuss or share that we haven't covered?

Interviewee 39:30
I don't think so. I think that was the main bits, because I wanted to pick up the goal posts on bits, the flood lights we've spoken about. I don't think there's much else. We've got the paper cups, again, polystyrene. We used to serve the food in the polystyrene bits. That's now everything's now card and paper, etc. And if we can, it's recycled card and paper, and then that will go into recycling again. And. No, I think that's most of it. And then, like, I say it's how much can we get the message out there? Because we are quite a prominent football club in the area. There's a lot of people down here that really respect us, so it's just leveraging that position. Yeah, yeah. It's just leveraging that position to sort of further get the message out there, but we realize we're on a journey.
We're very humble about where we are, and we want to take small but very deliverable steps on this.

APPENDIX H – SIGNED CONSENT FORMS

- Due to anonymity requests, signed consent forms are available on request.