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The Importance of Basketball for High School Students. Part 1 (Attractiveness Dimension Analysis)

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Abstract: *Background and Study Purpose. Basketball is an important worldwide sport and is frequently included in the school curriculum at various levels and in leisure activities. This study aims to determine the attractiveness and interest in basketball among high school students, as well as to compare it with other youth sports. Material and Methods. The investigated group consists of 259 high school students (16.97 years), with 135 males and 124 females, 156 urban and 103 rural. All students participated in physical education lessons with basketball topics. Questioning of the students for the component of the attractiveness of playing basketball was done by questionnaire with 14 items and closed answers at the level of this factor. The items were designed using a 5-level Likert scale. The completion of the questionnaires was carried out between November 2023 and January 2024. Results. The mean item values indicate high scores related to the spectacularity of basketball, as well as higher scores compared to track and field and gymnastics. The F values indicate strong influences of gender, but especially of background on students' choices. Males are significantly happier than females when they have basketball topics in their lessons. For almost all items of the attractiveness factor, those from rural areas give significantly lower mean scores than those from urban areas ($P < 0.05$), so there is a clear perception gap between these groups. The Gender *Area variables interaction generates significant differences ($P < 0.05$), but these are only evident for men. Conclusions. Across the entire group, even though basketball scores relatively better on average in terms of attractiveness than the rest of the team games, athletics and gymnastics, soccer remains at the top of high school students' preferences (47%). We found low values for playing basketball as a leisure activity, as well as for concerns about watching basketball competitions. However, men play basketball in their free time and watch competitions more than women. For men, soccer is the only sport more attractive than basketball, but basketball is more interesting than volleyball, handball, gymnastics and track and field. For women, soccer has a low attractiveness, while basketball, volleyball and gymnastics are more interesting. The differences between urban and rural (the whole group) for the attractiveness dimension are significant and entirely in favour of urban students. Urban students are more attracted, prefer, get involved, practice, and look forward more to basketball topics in curricular and extracurricular activities. The interaction between variables shows much larger differences between urban boys vs rural boys, but more balanced scores are found for urban girls vs rural girls.*

Keywords: *basketball, opinions, students, high school, attractiveness.*

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Introduction

The dynamics and evolution of the game of basketball worldwide, its varieties and the spatial-temporal experiences offered in the modern world are identified by (Colás, 2015). The physical activity of adolescents is positively associated with the presence of playgrounds, physical activity parks and sports courts (basketball), according to (Van Hecke et al., 2018). There are high schools that offer basketball programs on different levels of instruction for students. Three versions are identified: beginner basketball, team basketball and recreational basketball (Brusseau et al., 2020). At the Brazilian basketball level, attracting and retaining talented players in the club is associated with the administrative organization, the existence of a sense of belonging to the club and the existence of structural conditions (Folle et al., 2017).

The lower involvement of rural students in sports activities can be explained by deficiencies in infrastructure (ball fields, lack of community offers, social isolation, transportation) (Edwards et al., 2014). At the level of sports courts in China, basketball courts have a good representation in terms of number and area. However, there is still a gap between urban and rural areas in terms of physical activity facilities, to the advantage of the urban (Wang & Wang, 2020). The existence of a basketball ring on a line-marked court in neighbourhood parks is an important criterion that leads young people to visit such areas and engage in physical activities (Veitch et al., 2016). The use of parks for children from low-income neighbourhoods / New York City depends on existing utilities. Another issue reported is the variation in the use of different playgrounds (including basketball) by youth, according to African-American, Asian and Latino backgrounds (Marquet et al., 2019). For university students in Ethiopia, the factors that limit engagement in the game of basketball are varied. These include economic problems, poor equipment and infrastructure, inadequate curriculum, absenteeism, and poor student attitudes (Aboma & Tolera, 2020). The opinions expressed by Bulgarian university students for basketball indicate problems related to facilities, equipment, material base, and low number of theoretical and practical hours. Increasing the interest of young people in basketball requires better publicity and promotion on social media, according to (Dimitrova & Dimitrov, 2020).

In teaching basketball to students in Baghdad, the use of strategy of similarities has a favourable effect on the formation of the skills required by this game, according to (Maitham et al., 2021). Other studies promote inquiry-based teaching methods in basketball in China as a complementary

teaching variant. This solution facilitates students' initiative in their efforts to learn this sport, promoting mental and physical health (Aimin et al., 2015). The application of the Sport Education Model for university students has facilitated obvious advances related to content knowledge and performance in the offensive game, compared to classical teaching variants (Layne & Piipari, 2015). Basketball teaching is streamlined by implementing a metacognitive skills-based curriculum. Improvements in basketball offensive skills for young basketball players/under 16 in Iraq/ Specialized School of Basketball in Baghdad are found (Mohammed et al., 2021). For Chinese high school students, a problem-based learning model with a scientific approach facilitates the assimilation of chest passing technique in the game of basketball (Aditya et al., 2020).

As a modern team sport, basketball has also been successfully introduced in Asia. Basketball is very popular and publicized among high school sports in the USA, and there are many tournaments and championships in which students participate (Cianfrone et al., 2015; Leary, 2016). Basketball has become popular and practiced as a variant of physical activity and bodily cultivation in the monastic community/minority group in China (Casas, 2017). The popularity of basketball is high in the Philippines. It is practiced by all walks of life and at different times (festivals, events, holidays for students), according to (Antolihao, 2015). Basketball and table tennis are proposed as options for sustainable development of sports activities in rural schools in Gannan / China (Xianyi & Fengzhou, 2017). The high school physical education curriculum in Indonesia is structured in 7 dimensions. The first one is about Games and sports, and basketball is mentioned together with soccer, volleyball, badminton and traditional sports (Ardha et al., 2018).

Varied physical activities and strength exercises are important to reduce body fat and ensure correct body posture. They play a role in increasing resistance to stress, alleviating various health problems, beneficial morphological and functional transformations (Jorgić et al., 2024; Vizitiu & Constantinescu, 2023). Studies on low-income urban children have identified a preference for team sports (basketball, baseball, soccer). Preferences are also expressed for other physical activities: cycling, swimming, stretching, dancing, walking, jogging, tennis, and skateboarding (Heidelberger & Smith, 2016). Gender differences in involvement in sports activities and coaching careers are explained by existing models and social theory. The title "Dads play basketball and moms go shopping" is relevant to support this idea (Madsen, 2016). Women's participation in sports activities (basketball and other sports games) is still marked by gender inequalities (not as good,

competitive and financially rewarding as men). Media attention and fan support are still dominantly focused on male teams (for college level competitions in the USA) (Rayburn et al., 2015).

Purpose of the Study. The research investigates high school students' views on the attractiveness of playing basketball in physical education lessons and as a leisure activity.

Working hypotheses:

1. The applied questionnaire meets the validity and reliability criteria to measure the dimensions identified for this study.
2. We estimate that there are significant differences between men and women, urban and rural, in the responses to the questionnaire items (for the attractiveness factor).

Materials and Methods

Participants. The studied group consisted of 259 students/high school level (16.97 years old), formed by the selection of 6 high schools from Gorj county, Romania. Of these 135 students are male and 124 female, 156 come from urban and 103 from rural areas. The initial batch included 266 participants, but 7 questionnaires were cancelled due to errors in completing specific fields (missing answers or multiple answers for the same item). The main criteria for inclusion of participants were the presence of basketball topics in the planning documents and their participation in activities in physical education lessons. All students and legal guardians were informed about the purpose of the study. The requirements of ensuring the confidentiality of personal data/Helsinki Declaration (Sandu, 2012; "World Medical Association Declaration of Helsinki," 2013) were followed. The research was approved by the Institutional Ethics Committee (77/CEU/27.02.2024).

Research Design. The research was scheduled to run from September 2023 to January 2024, initially including the development of the questionnaire and then its application in the field. The construction of the questionnaire was based on the 5-step/Likert scale close response items. Initially, the questionnaire included 30 items, but after studying the correlation matrix 2 items were eliminated, which had weak associations with the rest of the questions. The development of the questionnaire and the content validation were carried out in the Human Performance Research Center of the Faculty of Physical Education and Sports/"Dunărea de Jos" University of Galați. The study fits and respects the requirements of cross-sectional research. Before completing the questionnaires, the meaning of each item was explained to the students separately, to avoid confusion.

Statistical Analysis. Processing of the research data was carried out using SPSS Software (Statistical Package for the Social Sciences/IBM Vers.24 Chicago, IL, USA. Factor analysis identified 2 distinct questionnaire components, each with 14 items: attractiveness and usefulness. Values for questionnaire validity (Pearson correlations) and reliability coefficient (Cronbach's Alpha) were calculated. Frequencies and percentages for each Likert scale step were calculated for each item. The Microsoft Excel chart editor facilitated the representation of means scores for the items of each dimension at the whole group level. Multivariate and Univariate parametric tests were applied, with the synthesis of F-values, differences between women and men, and urban and rural, and the calculation of size effect. The Bonferroni correction factor was used to compare means between pairs of data. The confidence interval was set at 95% (Armstrong, 2014; Hair, 2009; Murariu & Munteanu, 2018; Opariuc, 2011; Osborne, 2019; Sarma & Vardhan, 2018).

Results

The construct validity of the questionnaire is supported by the data presented in Table 1. It can be seen that the Pearson correlation coefficient values between the values of each item and the total/sum of the items are all positive, very strong ($r>0.8$) and strong (r included in the range 0.6-0.8) for most items. Moderate correlations (r included in the range 0.4-0.6) are identified only for items Q24 and Q25. All r values are associated with strongly significant thresholds ($P < 0.01$). For this reason, we consider that the validity of the questionnaire's internal consistency criteria are met for all 28 questionnaire items.

Table 1. Information related to the validity of the questionnaire items (Pearson correlation coefficients/r values between each item and the total values of all items) (N=259)

Item	Item/Dependent variable	r	Sig.
Q1	How much do you enjoy basketball topics in physical education lessons?	0.818**	0.000
Q2	How spectacular do you consider the game of basketball to be?	0.807**	0.000
Q3	In physical education lessons would you prefer to have basketball topics?	0.812**	0.000
Q4	How exciting is the game of basketball for you?	0.876**	0.000
Q5	Do you play basketball in your free time?	0.756**	0.000
Q6	Do you follow basketball-related sports competitions (as a spectator or on TV)?	0.699**	0.000
Q7	If there are no basketball topics planned in the lesson, then you consider the lesson to be:	0.858**	0.000
Q8	The joy you feel when participating in basketball-themed lessons is:	0.821**	0.000
Q9	How do you look forward to the physical education lessons where you will practice basketball topics?	0.795**	0.000
Q10	Compared to soccer, the game of basketball is for you:	0.648**	0.000
Q11	Compared to handball, the game of basketball is for you:	0.769**	0.000
Q12	Compared to volleyball, the game of basketball is for you:	0.815**	0.000
Q13	Compared to gymnastics, the game of basketball is for you:	0.749**	0.000
Q14	Compared to track and field, the game of basketball is for you:	0.746**	0.000
Q15	How useful do you think the game of basketball is in shapping your personality?	0.748**	0.000
Q16	By playing basketball, can you develop social and integration skills?	0.774**	0.000
Q17	Does learning the rules of basketball help form a fair play attitude?	0.755**	0.000
Q18	Could basketball influence your physical development and body harmony?	0.743**	0.000
Q19	Could basketball improve intellectual skills and problem-solving ability?	0.747**	0.000
Q20	As a leisure activity do you think basketball is accessible for children and young people?	0.692**	0.000
Q21	Could playing basketball help optimise your health?	0.744**	0.000
Q22	Does basketball provide stress relief and recreation after intellectual demands?	0.697**	0.000
Q23	The effect of playing basketball on exercise capacity and fitness level is:	0.694**	0.000
Q24	The effect of playing basketball on muscle strength of major body segments:	0.562**	0.000
Q25	Select the effect of the basketball game on stamina/endurance:	0.545**	0.000
Q26	Select the effect of the basketball game on speed:	0.651**	0.000
Q27	Select the effect of the basketball game on coordination (coordination skills):	0.722**	0.000
Q28	Identify the influence of basketball themes of developing flexibility:	0.709**	0.000

The results of the KMO/Kaiser-Meyer-Olkin tests (which indicates the proportion of joint variance) and Bartlett's Test of Sphericity (which tests whether the matrix of inter-item correlations is significantly different from a unit matrix) are shown in Table 2. The KMO=0.943 value is much

higher than the cut-off threshold of 0.5, and the χ^2 value is associated with a strong significance threshold (Sig.=0.000), thus conditions for applying PCA and identifying common dimensions/factors.

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.943
Bartlett's Test of Sphericity	Approx. Chi-Square (χ^2)	7433.725
	df	378
	Sig.	0.000

The results of the exploratory factor analysis, which involves the use of PCA/Principal Component Analysis with orthogonal Varimax rotation, allowed the identification of how each item loads on components/factors. At the level of the whole questionnaire, 3 components/dimensions or principal factors are identified (with eigenvalue ≥1), which cumulatively explain 71.214% of the total variance. Component 1/factor 1 explains 35.115% of the variance, component 2/factor 2 explains 31.511% of the variance, and component 3 only 4.588% of the variance (Table 3).

Table 3. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.547	55.524	55.524	15.547	55.524	55.524	9.832	35.115	35.115
2	3.259	11.638	67.162	3.259	11.638	67.162	8.823	31.511	66.626
3	1.135	4.052	71.214	1.135	4.052	71.214	1.285	4.588	71.214

Extraction Method: Principal Component Analysis.

The component matrix after applying Varimax with Kaiser Normalization indicates a dominant loading of items on two main components/dimensions or factors, as shown in Table 4. Component 1 is dominantly and strongly loaded with 14 items whose value is > 0.6 and which include questions related to basketball attractiveness (Q1-Q14) with the selected balance decreasing. This component/dimension will be referred to as the Attractiveness factor. Component 2 includes 13 items with strong loading (> 0.6), which are related to the usefulness of basketball. Component 3 includes only one item with strong loading (Q25), but this item also has good loading at the level of component 2. The rest of the items have weak loadings at the level of component 3, so they will be removed from the analysis. Due to the fact that a factor cannot include only one item,

we decided to include Q25 also at the level of component 2, which will be called the Utility dimension/factor, which also has 14 items (Q15-Q28).

Table 4. Level of item loading per component, following the application of Principal Component Analysis (with Varimax with Kaiser Normalization)

Rotated Component Matrix[a]	Component		
	1	2	3
Q3 In physical education lessons would you prefer to have basketball topics?	.849	.284	.012
Q7 If there are no basketball topics planned in the lesson, then you consider the lesson to be:	.845	.356	.031
Q8 The joy you feel when participating in basketball-themed lessons is:	.844	.298	.067
Q5 Do you play basketball in your free time?	.837	.196	.188
Q1 How much do you enjoy basketball topics in physical education lessons?	.836	.302	.092
Q9 How do you look forward to the physical education lessons where you will practice basketball topics?	.826	.277	.085
Q2 How spectacular do you consider the game of basketball to be?	.820	.311	-.022
Q4 How exciting is the game of basketball for you?	.810	.426	-.057
Q11 Compared to handball, the game of basketball is for you:	.761	.322	-.113
Q6 Do you follow basketball-related sports competitions (as a spectator or on TV)?	.740	.213	.211
Q13 Compared to gymnastics, the game of basketball is for you:	.738	.329	-.333
Q12 Compared to volleyball, the game of basketball is for you:	.729	.425	-.156
Q10 Compared to soccer, the game of basketball is for you:	.714	.164	.263
Q14 Compared to track and field, the game of basketball is for you:	.693	.383	-.428
Q18 Could basketball influence your physical development and body harmony?	.262	.801	.095
Q16 By playing basketball, can you develop social and integration skills?	.325	.791	-.022
Q21 Could playing basketball help optimise your health?	.295	.786	-.106
Q26 Select the effect of the basketball game on speed:	.169	.767	.047
Q17 Does learning the rules of basketball help form a fair play attitude?	.324	.766	-.047
Q27 Select the effect of the basketball game on coordination (coordination skills):	.283	.744	.177
Q19 Could basketball improve intellectual skills and problem-solving ability?	.323	.742	.089
Q28 Identify the influence of basketball themes of developing flexibility:	.271	.738	.183
Q15 How useful do you think the game of basketball is in shapping your personality?	.346	.719	.058
Q22 Does basketball provide stress relief and recreation after intellectual demands?	.296	.702	.062
Q23 The effect of playing basketball on exercise capacity and fitness level is:	.290	.700	.109
Q20 As a leisure activity do you think basketball is accessible for children and young people?	.309	.695	-.136
Q24 The effect of playing basketball on exercise capacity and fitness level is:	.137	.636	.524
Q25 Select the effect of the basketball game on stamina/endurance:	.159	.577	.608

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The values of the reliability coefficient (Cronbach's Alpha) and the test of equality of the averages for the answers to the items at the Attractiveness factor level are presented in Table 5. It can be seen that the Cronbach's Alpha score is much higher than the accepted threshold limit (>0.6). It can be concluded that the items of this dimension measure very accurately (high level of reliability) the students' opinions related to the attractiveness of the game of basketball. Hotelling's T-Squared Test value is associated with a statistically significant threshold, so students' responses to the items of this factor are not identical and there are variations in opinion across the selected scores.

Table 5. Cronbach's Alpha and Hotelling's T-Squared Test values for factor 1/Atractiveness

	Reliability Statistics			**Hotelling's T-Squared Test**				
Factors	**Cronbach's Alpha**	**Cronbach's Alpha Standardized Items**	**N of items**	**Hotelling's T-Squared**	**F**	**df1**	**df2**	**Sig.**
F1/ Attractiveness	0.969	0.970	14	360.107	26.412	13	246	0.000

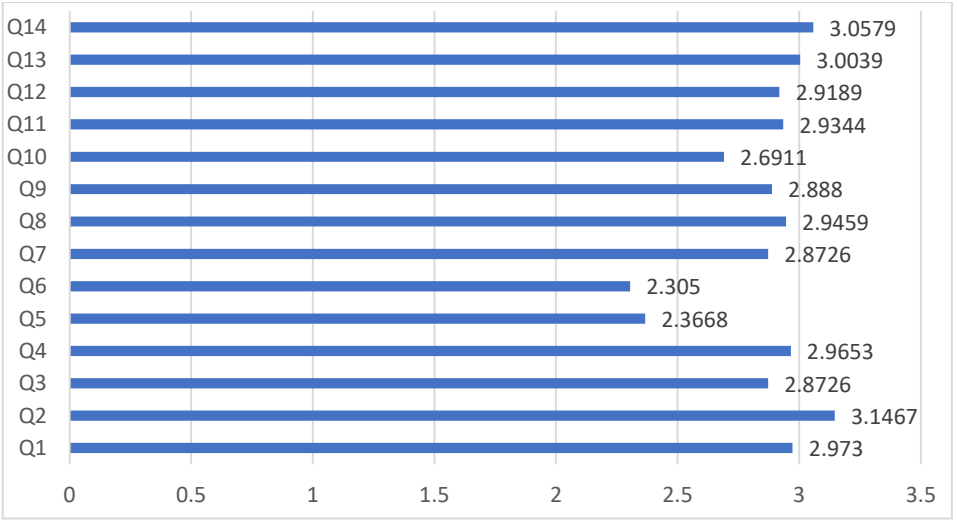
The items of the Attractiveness factor, the Likert scale with the scores, the related response variants and the percentages allocated to each level are summarised in Table 6. For most of the items, we noted high percentages of response for level 3 (medium) of the Likert scale and lower percentage values for the extremes (levels 1/2 and 4/5). However, there are some exceptions. For Q5 (playing basketball during free time) 57.9% indicates levels 1 and 2 (never and rarely) and only 5.4% always play basketball during free time (level 5). The situation is similar for Q6 (watching basketball competitions), where 60.2% indicate levels 1 and 2 (never and rarely), and not a single student consistently watches these competitions (0% for level 5). For Q10 (attractiveness of basketball compared to soccer) we observe that almost half of the students (46.7%) indicate levels 1 and 2 (totally uninteresting and less interesting). For Q11-Q14 (comparing the attractiveness of basketball with handball, volleyball, gymnastics and track and field) we note relatively balanced percentages between the extreme level scores (1/2 vs 4/5). We also noted slightly higher percentage values for the lower 1/2 scores compared to the higher 4/5 scores in Q3 (preference for basketball topics in the lesson). The situation is similar in Q7 (attractiveness of the lesson when basketball topics are missing) and Q9 (interest in lessons where basketball topics are planned).

Table 6. Percentage distribution of responses for Likert scale levels for the Attractiveness factor

Item	5	4	3	2	1
Q1	*How much do you enjoy basketball topics in physical education lessons?*				
	A lot (5%)	Much (22%)	Moderate (43.2%)	Very little (24.7%)	Not at all (5%)
Q2	*How spectacular do you consider the game of basketball to be?*				
	Very spectacular (8.9%)	Spectacular (24.7%)	Medium spectacular (41.7%)	A little spectacular (21.6%)	Not at all spectacular (3.1%)
Q3	*In physical education lessons would you prefer to have basketball topics?*				
	Always (5.8%)	Often (20.5%)	Sometimes (35.9%)	Rarely (30.9%)	Never (6.9%)
Q4	*How exciting is the game of basketball for you?*				
	Very exciting (8.9%)	Exciting (20.5%)	Medium exciting (39%)	A little exciting (21.6%)	Not exciting (10%)
Q5	*Do you play basketball in your free time?*				
	Always (5.4%)	Frequent (8.5%)	Sometimes (28.2%)	Rarely (33.2%)	Never (24.7%)
Q6	*Do you follow basketball-related sports competitions (as a spectator or on TV)?*				
	Always (0%)	Frequent (15.1%)	Sometimes (24.7%)	Rarely (35.9%)	Never (24.3%)
Q7	*If there are no basketball topics planned in the lesson, then you consider the lesson to be:*				
	Unattractive (1.9%)	A little attractive (25.9%)	Medium attractive (38.2%)	Attractive (25.5%)	Very attractive (8.5%)
Q8	*The joy you feel when participating in basketball-themed lessons is:*				
	Very big (7.3%)	Big (22%)	Moderate (38.2%)	Low (22.8%)	Very low (9.7%)
Q9	*How do you look forward to the physical education lessons where you will practice basketball topics?*				
	With great interest (5.4%)	With interest (28.6%)	With moderate interest (27%)	With little interest (27.4%)	Without interest (11.6%)
Q10	*Compared to soccer, the game of basketball is for you:*				
	Much more interesting (6.9%)	More interesting (12.4%)	Just as interesting (34%)	Less interesting (36.3%)	Totally uninteresting (10.4%)
Q11	Compared to handball, the game of basketball is for you:				
	Much more interesting (5.8%)	More interesting (29%)	Just as interesting (30.1%)	Less interesting (23.2%)	Totally uninteresting (12%)
Q12	*Compared to volleyball, the game of basketball is for you:*				
	Much more interesting (6.9%)	More interesting (26.6%)	Just as interesting (27%)	Less interesting (30.1%)	Totally uninteresting (9.3%)
Q13	*Compared to gymnastics, the game of basketball is for you:*				
	Much more interesting (10.4%)	More interesting (29.3%)	Just as interesting (19.3%)	Less interesting (32%)	Totally uninteresting (8.9%)
Q14	*Compared to track and field, the game of basketball is for you:*				
	Much more interesting (7.3%)	More interesting (26.3%)	Just as interesting (29.3%)	Less interesting (26.3%)	Totally uninteresting (7.3%)

The mean scores for the Attractiveness factor items (fig.1) show higher values for a number of questions. The highest value is obtained for Q2 (spectatorship of basketball), followed by Q14 and Q13 (interest in basketball compared to athletics and gymnastics). Higher values are obtained for Q1 (enjoyment of basketball topics) and Q4 (interest in basketball). Q11 and Q12 (interest in basketball compared to handball and volleyball) follow. The lowest average scores are found for Q6 (watching basketball competitions as a spectator or on TV) and Q5 (playing basketball during leisure time). A low score is also identified for Q10 (interest in basketball compared to soccer).

Fig.1. Mean values of the ***Attractiveness*** factor items for the whole studied sample (N=259)



The data provided by the multivariate/MANOVA analysis for the Attractiveness factor (Table 7) indicate strong and statistically significant effects of the two independent variables and their interaction on the items in this dimension. All three F values are associated with significance thresholds (Sig. < 0.05), and the η^2_p results indicate a strong influence of the independent variables on the dependent variables. 43.3% of the variance of item responses is driven by the Gender variable and 26.2% of the variance is driven by the Area variables. The interaction Gender *Area variables explains 16.1% of the variance of item-level responses to this factor.

Table 7. Multivariate tests [a] /MANOVA results for the Attractiveness factor.

Effect	λ	F	Hypothesis df	Error df	Sig.	η^2_p	Observed Power
Gender	0.567	13.211[b]	14.000	242.000	0.000	0.433	1.000
Area variables	0.737	6.180[b]	14.000	242.000	0.000	0.263	1.000
Gender *Area variables	0.839	3.315[b]	14.000	242.000	0.000	0.161	0.998

a. Design: Gender + Area variables + Gender *Area variables

b. Exact statistics

λ-Wilk's lambda; F-Fisher test; df-degrees of freedom; Sig.-level of probability; η^2_p-partial eta squared

Gender differences in students' opinions on the attractiveness factor are summarised in Table 8. Males have higher mean scores on almost all items except Q10 (where basketball attractiveness is lower than soccer attractiveness at the significant level/ $P < 0.05$). Other significant differences are obtained for items Q5 (men play more basketball during leisure time), Q6 (men watch more basketball competitions) and Q8 (men's enjoyment is higher when participating in basketball lessons). Other significant differences are reported for items Q12, Q13, and Q14 (men enjoy basketball more compared to volleyball, gymnastics, and track and field). For the rest of the items, even if the mean values of men's opinions were higher than women's, we did not find significant differences ($P > 0.05$).

Table 8. Results of analysis of variance/ANOVA and pairwise differences for the independent variable gender (male=135, female=124) for the attractiveness factor

Item	Group	Mean	Std. Deviation	Std. Error	a-b	F(1, 257)	Sig[b].	η^2_p	Observed Power
Q1	a. Male	3.037	1.010	0.080	0.134	1.330	0.250	0.005	0.210
	b. Female	2.903	0.840	0.084					
Q2	a. Male	3.200	1.104	0.083	0.111	0.866	0.353	0.003	0.153
	b. Female	3.088	0.775	0.086					
Q3	a. Male	2.940	1.091	0.086	0.142	1.297	0.256	0.005	0.206
	b. Female	2.798	0.901	0.090					
Q4	a. Male	3.007	1.266	0.094	0.088	0.423	0.516	0.002	0.099
	b. Female	2.919	0.851	0.098					
Q5	a. Male	2.681	1.213	0.091	0.657*	24.898	0.000	0.088	0.999
	b. Female	2.024	0.859	0.095					
Q6	a. Male	2.540	1.056	0.084	0.492*	16.554	0.000	0.061	0.982
	b. Female	2.048	0.872	0.087					
Q7	a. Male	2.888	1.055	0.083	0.034	0.081	0.776	0.000	0.059
	b. Female	2.854	0.842	0.086					
Q8	a. Male	3.103	1.087	0.091	0.330*	6.345	0.012	0.024	0.709
	b. Female	2.774	1.010	0.094					
Q9	a. Male	3.014	1.203	0.095	0.265	3.719	0.055	0.014	0.485
	b. Female	2.750	0.984	0.099					
Q10	a. Male	2.474	1.056	0.088	-0.453*	12.738	0.000	0.047	0.945
	b. Female	2.927	0.980	0.092					
Q11	a. Male	3.044	1.145	0.095	0.230	2.793	0.096	0.011	0.384
	b. Female	2.814	1.062	0.099					
Q12	a. Male	3.148	1.168	0.093	0.479*	12.758	0.000	0.047	0.945
	b. Female	2.669	0.968	0.097					
Q13	a. Male	3.274	1.155	0.099	0.564*	15.636	0.000	0.057	0.976
	b. Female	2.709	1.138	0.103					
Q14	a. Male	3.289	1.132	0.093	0.482*	12.926	0.000	0.048	0.948
	b. Female	2.806	1.017	0.097					

*. The mean difference is significant at the .05 level.
The F tests the effect of gender. / This test is based on the linearly independent pairwise comparisons among the estimated marginal means.
b. *Adjustment* for multiple comparisons: Bonferroni.

The differences between urban and rural students for the Attractiveness factor are summarised in Table 9. The mean values of urban students' responses are higher and statistically significant ($P < 0.05$) than those of rural students for almost all items. The only exception is item Q11 (attractiveness of basketball compared to handball), where the difference between the groups is not significant ($P > 0.05$). These significant differences indicate the high gap between urban and rural students in terms of perceived attractiveness, perceived enjoyment and involvement in the game of basketball for physical education lessons and leisure activities.

Table 9. Results of analysis of variance/ANOVA and pairwise differences for the independent variable *Area variables* (urban=156, rural=103) for the attractiveness factor

Item	Group	Mean	Std. Deviation	Std. Error	a-b	F(1, 257)	Sig[b].	η^2_p	Observed Power
Q1	a. Urban	3.173	0.916	0.072	0.503*	19.305	0.000	0.070	0.992
	b. Rural	2.669	0.878	0.089					
Q2	a. Urban	3.423	0.923	0.072	0.695*	36.935	0.000	0.126	1.000
	b. Rural	2.728	0.865	0.089					
Q3	a. Urban	3.128	0.927	0.077	0.643*	28.011	0.000	0.098	1.000
	b. Rural	2.485	0.998	0.094					
Q4	a. Urban	3.198	1.074	0.084	0.587*	19.396	0.000	0.070	0.992
	b. Rural	2.611	1.012	0.103					
Q5	a. Urban	2.609	1.194	0.086	0.609*	20.170	0.000	0.073	0.994
	b. Rural	2.000	0.840	0.105					
Q6	a. Urban	2.480	1.012	0.078	0.442*	12.618	0.000	0.047	0.943
	b. Rural	2.038	0.928	0.097					
Q7	a. Urban	3.083	0.929	0.074	0.530*	20.411	0.000	0.074	0.994
	b. Rural	2.553	0.915	0.091					
Q8	a. Urban	3.211	1.009	0.081	0.668*	26.981	0.000	0.095	0.999
	b. Rural	2.543	1.017	0.100					
Q9	a. Urban	3.185	1.094	0.084	0.749*	31.612	0.000	0.110	1.000
	b. Rural	2.436	0.976	0.103					
Q10	a. Urban	2.859	0.980	0.082	0.422*	10.511	0.001	0.039	0.898
	b. Rural	2.436	1.090	0.101					
Q11	a. Urban	3.006	1.150	0.089	0.181	1.657	0.199	0.006	0.250
	b. Rural	2.825	1.042	0.109					
Q12	a. Urban	3.032	1.103	0.088	0.284*	4.186	0.042	0.016	0.531
	b. Rural	2.747	1.082	0.108					
Q13	a. Urban	3.230	1.233	0.092	0.571*	15.321	0.000	0.056	0.974
	b. Rural	2.660	1.005	0.113					
Q14	a. Urban	3.230	1.140	0.087	0.435*	9.961	0.002	0.037	0.882
	b. Rural	2.796	0.993	0.107					

*. The mean difference is significant at the .05 level.
The F tests the effect of gender. / This test is based on the linearly independent pairwise comparisons among the estimated marginal means.
b. *Adjustment* for multiple comparisons: Bonferroni.

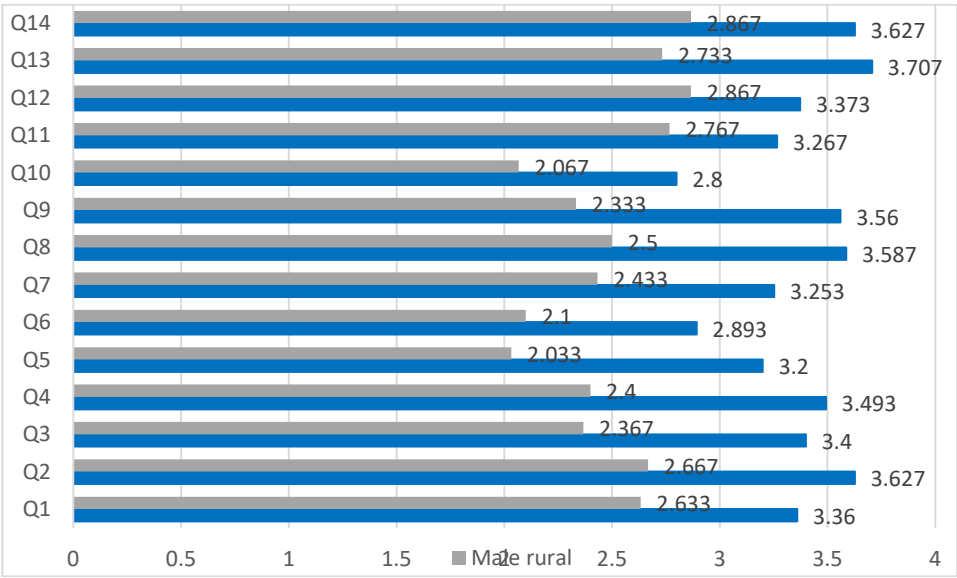
The ANOVA results for the interaction between the independent variables on the Attractiveness dimension are summarised in Table 10. Most of the items show statistically significant F values ($P < 0.05$), which means that Gender *Area variables influence the opinions expressed by students at the level of this factor. The only exceptions ($P > 0.05$) are found for items Q1 (enjoyment of basketball topics in lessons) and Q12 (interest in basketball compared to volleyball).

Table 10. Results of the analysis of variance/ANOVA for the interaction between Gender and Area variables on the *Attractiveness* factor

Item	Interaction	Mean Square	F (1, 255)	Sig[b].	η^2_p	Noncent. Parameter	Observed Power
Q1	Gender *Area variables	3.054	3.820	0.052	0.015	3.820	0.495
Q2	Gender *Area variables	4.435	5.600	0.019	0.021	5.600	0.655
Q3	Gender *Area variables	9.951	11.406	0.001	0.043	11.406	0.920
Q4	Gender *Area variables	17.596	16.975	0.000	0.062	16.975	0.984
Q5	Gender *Area variables	17.077	17.955	0.000	0.066	17.955	0.988
Q6	Gender *Area variables	6.402	7.365	0.007	0.028	7.365	0.771
Q7	Gender *Area variables	5.766	6.898	0.009	0.026	6.898	0.744
Q8	Gender *Area variables	10.429	10.945	0.001	0.041	10.945	0.909
Q9	Gender *Area variables	14.300	13.961	0.000	0.052	13.961	0.961
Q10	Gender *Area variables	9.114	9.295	0.003	0.035	9.295	0.859
Q11	Gender *Area variables	6.274	5.236	0.023	0.020	5.236	0.625
Q12	Gender *Area variables	2.110	1.859	0.174	0.007	1.859	0.274
Q13	Gender *Area variables	8.378	6.997	0.009	0.027	6.997	0.750
Q14	Gender *Area variables	5.369	4.906	0.028	0.019	4.906	0.597

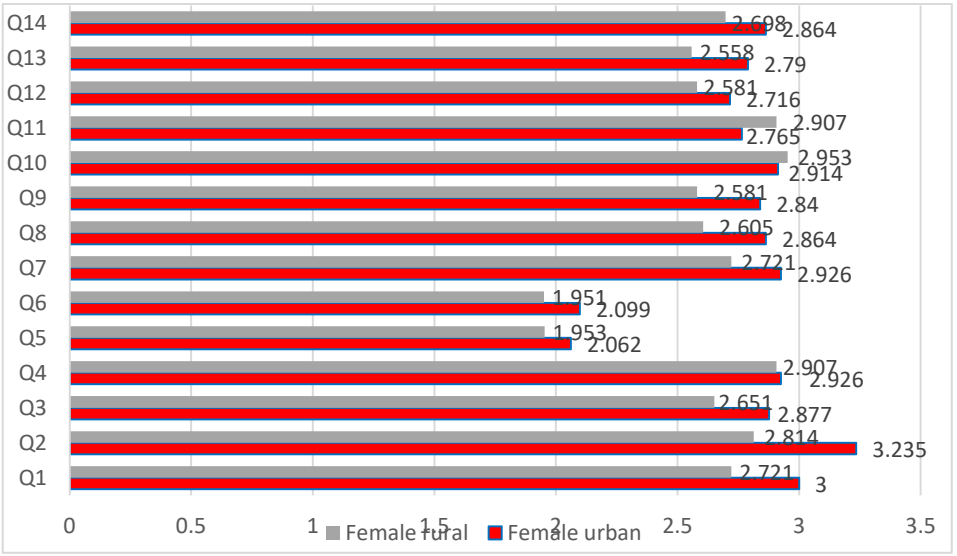
The graphical representations of the mean values for urban males and rural males on the Attractiveness dimension are shown in Figure.2. It can be seen for all items the superiority of the scores for urban males, who are thus more optimistic in the opinions expressed about the attractiveness of the game of basketball. The highest mean scores for them are obtained for Q13 (attractiveness of basketball compared to gymnastics), Q14 (attractiveness of basketball compared to track and field), Q2 (spectacularity of basketball), Q8 (enjoyment of basketball lessons) and Q9 (interest in basketball lessons). The lowest mean scores for urban males are reported for Q10 (interest by comparison with soccer) and Q6 (watching basketball competitions). The lowest mean scores for rural males are obtained for Q5 (playing basketball during free time), Q10 (interest by comparison with soccer) and Q6 (watching basketball competitions).

Fig. 2. Comparative means values for *male* (urban /N=75and rural/N=60) for the *Attractiveness* factor



The graphical representations of the mean values for urban females and rural females for the Attractiveness factor are shown in Figure 3. Unlike the values analysed for males, in the case of females we observed that the differences between the two samples are smaller. Even though urban females have better mean scores for most items, we also identified two cases where rural females have higher mean values. There are: Q10 (attractiveness compared to soccer) and Q11 (attractiveness compared to handball). The highest scores for urban females are Q2 (spectacularity of basketball), Q4 (interest in basketball) and Q7 (lower attractiveness of the lesson when basketball topics are missing). Both groups obtained the lowest values for Q5 (playing basketball during free time) and Q6 (watching sports competitions).

Fig. 3. Comparative means values for *female* (urban/N=81 şi rural/N=43) for the *Attractiveness* factor



Discussion

Attractiveness and accessibility of sports activities for young people are important objectives to shape an active lifestyle. Modifying court sizes, playing equipment or rules allow even those with disabilities to play basketball and other sports (Lubans et al., 2017). Implementing the SE/Sport Education variant in the process of teaching basketball in schools for Spanish children is more effective than the classical Direct Instruction (DI) variant. Through this alternative, the Moderate to Vigorous PA (MVPA) and the student's interest in the game of basketball increases. Solutions for autonomy and healthy lifestyle formation are thus created (Guijarro et al., 2019). Basketball is perceived as a moment of enjoyment for students who are passionate about team games, but there are also cases of rejection and desire to be involved in other physical activities. Four factors are identified that determine students' active involvement in physical education lessons (autonomy, attractiveness of the task, competence for the activity and social belonging), according to (Leisterer & Jekauc, 2019). Our study identifies 6.9% of students as rejecting basketball (minimum score given), 30.9% would like to have basketball topics less often, and 26.3% prefer to frequently or always have basketball in the lesson.

Basketball is among the top physical activities played away from school and preferred by young people in the USA, along with other team

sports, walking/running and cycling (Banville et al., 2021). Nearly a quarter of the students in our sample never play basketball as a leisure activity, with only 13.9% preferring it frequently or consistently as a leisure activity.

For young people in the USA, providing the material base for playing different sports (e.g. basketball courts and hoops) in rural and urban areas are basic conditions for increasing involvement in physical activities. Significant differences were found related to basketball courts in favour of non-rural adolescents, but for involvement in physical activities at home or on weekends, there were no significant differences (Christiana et al., 2021). Differences in obesity levels and preferred physical activities between urban and rural areas in the US are identified by several studies (Davis et al., 2008; McCormack & Meendering, 2016). Basketball holds the top position in activities practiced by rural adolescents, followed by cycling and dancing. For urban, jogging ranks first, followed by basketball and walking. However, our results indicate a much lower involvement of rural people in basketball/leisure compared to urban people, as well as women compared to men.

Gender differences for young people in England (ages 15-16) are evident in terms of preferences and participation in physical activities. Males are more involved in these activities, preferring traditional team sports (basketball, cricket, soccer, rugby), but also boxing, motorsport, and extreme sports. However, females prefer gym/fitness and dance for their effect on physical attractiveness and body shaping (Metcalfe & Lindsey, 2020). Our research indicates a clear orientation towards soccer for the whole group, with 46.7% of students finding basketball less attractive and only 6.9% finding it more interesting.

Among adolescents in Western Australia, the existence of basketball/netball hoops facilitates a good use of them in physical activities (9.3-24%). These scores provide basketball with a higher position in the top preferences compared to cricket, soccer, athletics, baseball, etc. (Edwards et al., 2015). Basketball ranks high in the ranking of sports played in Australia (State of Victoria). For children and youth/under 15, it is ranked 3rd (12.9%), after swimming and Australian football. For adults, it is ranked 4th, after swimming, golf and tennis (Eime et al., 2020). The popularity of basketball among young Australians is evident, as they often play and/or watch major basketball competitions (TV, social media and live platforms), according to (Thomas et al., 2018). Our data do not confirm the massive participation of students in watching basketball games: 60.2% do not watch these competitions at all or rarely. Only 15.1% give frequent importance to watching basketball games, with males more attracted than females and urban more attracted than rural.

Basketball is a sport loved by university students in China and is included in the curriculum that aims at physical development, mental health, good health, motor skills and a high level of fitness. However, nearly 40% of students have a difficult/hardly weekly involvement, 29% participate only once/week, 21% participate 3-4 times and only 10% more than 4 times (Li & Shen, 2022). Basketball is among the top favourite sports activities in high school physical education lessons for Chinese students (Zhumadian City). The percentage of males who like basketball in lessons is 30.95% higher than females (22.8%). Other sports games preferred by both genders but with lower percentages are soccer and volleyball (Yao et al., 2017). For our group, only 26% would prefer basketball in all physical education lessons, while 37.8% would not like or would rarely like basketball topics in lessons. However, males have better mean scores for basketball preferences, but not statistically significant.

A study of high school students in Poland identified their preferences for different sports in physical education lessons. Team games are at the top of the preferences for both genders (48.6% for females and 57.2% for males). For females, basketball is equal to handball preferences (7.7%), but lower than soccer (10.3%) and volleyball, which is in first place (23.1%). For males, basketball (14.6%) is more important than handball (4.9%) and volleyball (12.2%), but still ranked first is soccer (21.9%), according to (Papla et al., 2019). Investigations on Polish adolescents (both genders/13-16 years) from urban and rural environments identified major differences in preferences and involvement in sports activities. The level of knowledge related to physical culture is better for urban. Soccer is at the top of preferences in rural areas (38%), followed by cycling, roller-skating and skateboarding, while basketball is not even mentioned. Soccer is three times more popular in rural areas than in urban areas. However, urban students prefer basketball in their free time, which comes first (18%), followed by volleyball (10%) (Dziubiński & Magdziarz, 2014). However, for our full group, soccer comes first in terms of preferences, but basketball has a higher level of attractiveness than the other team games.

The involvement of young Belgians in physical activities in public spaces in big cities is conditioned by physical and social factors (accessibility, proximity, safe social environment). Basketball is practiced by 18.2% of the surveyed females (similar score to jogging), with soccer (27.3%) in first place. Males are more involved in basketball (31.6%) also in second place after soccer (78.9%) (Hecke et al., 2016). These results are similar to our research, indicating top preferences for soccer only among males. Female's means scores indicate a higher attractiveness for basketball and other sports games, especially volleyball.

In Romania, the main sports activities preferred by young people are basketball, soccer, handball, volleyball and swimming. These options are optimal as forms of leisure, and socialization and as ways to promote an active lifestyle (Baciu & Baciu, 2015). For high school students (both genders) in urban areas (Romania/Resita), basketball leads as a leisure sport option at 42%, followed by soccer with 27% and fitness with 15%. Basketball is also in first place for sports games played in physical education lessons/59%, followed by soccer/21% and handball at 20%, according to (Dacica, 2015). However, our research indicates a much greater attraction to soccer among those in rural areas, who do not look forward to basketball topics with much interest in the lesson. Urban students are more attracted to basketball compared to volleyball, handball, gymnastics and athletics.

A study on high school students from Turkey identified the preferences for sports activities for physical education activities. For females, volleyball is at the top, basketball in the second position and then soccer. For males, soccer is in the first place, followed by basketball in the second place and then volleyball (Başar & Coşkun, 2017). The importance given to basketball at the social level is also materialised by its presence within Sports Betting. For the young students of Madrid, it occupies second place in preference, after soccer bets (Labrador & Vallejo-Achón, 2020). The results of our study also indicate very good values for the preference of volleyball, basketball and gymnastics for urban and rural females, which advance soccer. Even though, compared to basketball, soccer has the best mean scores of all sports, first for the rural males, then for the urban ones.

Conclusions

Reliability and validity factor analysis values indicate that the questionnaire items accurately measure the established traits. At the level of the whole group, even though basketball scores relatively better on average than the rest of the team games, athletics and gymnastics, soccer remains on top of the preferences of high school students (47%). We found low values related to the practice of basketball as a leisure activity, as well as for the concerns about watching basketball competitions. However, males play basketball in their free time and watch competitions more than females. For males, soccer is more attractive than basketball, but basketball is more interesting than volleyball, handball, gymnastics and athletics. For females, soccer is last in attractiveness, basketball, volleyball and gymnastics are more interesting. The differences between urban and rural (whole group) for the attractiveness dimension are significant and entirely in favour of urban students. Urban students are more attracted, prefer, get involved, practice, and

look forward more to basketball topics in curricular and extracurricular activities. Interaction between variables shows much larger differences between urban males vs rural males but more balanced scores are found for urban females vs rural females.

Limits of the study and future research directions: The small area and the relatively small number of participants are the main limitations of the research. The results obtained cannot be generalised, as studies on larger groups and from different areas nationwide are needed. A quantitative and qualitative analysis of basketball infrastructure (courts and hoops) between urban and rural areas would be complementary to our study, as these variables influence the involvement of young people in playing the game.

Acknowledgement

Conflict of interest

No potential conflict of interest that is of any relevance to this study was reported by the authors.

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