Original Article

Sociometry of a volleyball team

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Abstract:

This study is relevant because there is a need to solve pedagogical problems to ensure the cohesion of the sports team during the preparation for competitions.

The aim of the study is to determine the characteristics of the group structure and relationships between the players using the university volleyball team as an example. The study was conducted in 2017-2018 at the Department of Physical Education and Sport of the Ural State University of Economics (Ekaterinburg, Russia). The information base of the research consists of the survey data from 22 students from the volleyball team.

The research methodology is based on the sociometric method of structural analysis of small groups.

The group cohesion index is acceptable on the basis of the "work during training" criterion, but it is very low based on the other two criteria. This observation occurs because the interpersonal communication within the team is not sufficiently strong. The team did not interfere with training aimed to improve cohesion.

Currently, many team members fall out of the overall communication structure. According to the "work during training" criterion, only two members of the team had a zero status. However, according to the "free time" and "interaction during the game" criteria, there were 10 and 6 such people, respectively. It is hoped that along with the development of the team, more participants will be included in group communication and belong to the average subgroup of popularity.

Key Words: sports team, sociometry, assessment criteria, socio-psychological climate

Introduction

An important pedagogical task is to select a sports team in such a way as to create a favorable social and psychological climate. Harmonization of interpersonal relationships leads to successful collaboration on the playground. In the works of Sabin 2015 and Martin 2017 it is noted that the process of interaction between team members should be aimed at increasing cohesion. At the same time, the search for scientific methods is necessary, which make it possible to track the dynamics of team cohesion. In the works of Ussorowska 2016, Lazunina 2015, Anderson 2017 and Nikitina 2018, the sociometric approach proposed by Moreno 1960 is used as the main methodology for studying intra-group relationships of players, according to which a change in psychological relations in a small group is supposedly the main condition for changes in the entire social system.

The aim of the study is to determine the characteristics of the relationship of players and group structure on the example of the university volleyball team. The study was conducted at the Department of Physical Education and Sport of the Ural State University of Economics (Ekaterinburg, Russia) at the period of 2017-2018. The information base of the research consists of survey data of 22 students of the volleyball team.

The research methodology is based on the sociometric method of structural analysis of small groups.

Material & methods

Based on the principles and methods set forth in the works of Wäsche 2017, Herbison 2018, Timushkin 2018, Sopa 2018 and Dontsov 2018, we developed a sociometric survey to determine the likes and dislikes of the members of the university volleyball team.

The survey includes the following questions and options, table 1.

Table 1. Questions and answer choices for sociometric research

Question	Answer option
Which team member do you prefer to work out with?	choice - a strong desire to cooperate with others;
Which team member do you prefer to spend your free time with?	deviation - a negative choice - the expressed unwillingness of the individual to cooperate with others;
Which team members can you rely on in a difficult game situation?	lowering - leaving one individual without attention

*Compiled by the authors

Further, as noted in the works of Lopatiev 2017 and Ivashchenko 2017, it is necessary to construct a matrix of respondents' choices for each question and calculate the amounts of made, received and mutual choices. Vertically recorded by the numbers the names of all team members, horizontally - only their number. At the corresponding intersections, the numbers +1, +2, +3 designate those whom each subject selected in the first, second, third order. Mutual positive selection is outlined in the table (regardless of the choice order). After the positive choices are entered into the table, it is necessary to calculate vertically the algebraic sum of all the choices received by each member of the team (the sum of the choices). Then it is necessary to calculate the sum of points for each member of the team, taking into account that the choice in the first place equals +3 points, in the second – +2, in the third – +1. After that, the total algebraic sum is calculated, which determines the status in the team.

Then subgroups of unpopular, medium and popular team members were selected for each criterion and tabulated. Popular we call the team members who received the most choices from their colleagues. In this team, respondents who received a score of more than 9 belong to the popular category. Changes in the position of the respondents in the team depending on the criterion were evaluated. The group cohesion index was also calculated, reflecting the level of development of the team and the degree of its integration at the moment. The group cohesion index is calculated as the ratio of the sum of mutual choices to the total number of possible choices in a group.

The integral indicator, which allows for a synthesis of the estimates presented in the formula 1:

$$I = \frac{V_p}{V_o}$$

where I – team cohesion index

V_p – number of mutual positive choices

V_o – total number of possible choices

Thus, consistently implementing the stages of the methodology, we obtain information on the intragroup characteristics of the relations between members of the volleyball team.

Results

On the basis of the data obtained during the survey, tables with the primary answers of all respondents (encrypted with letters) were built.

Table 2. Sociometric matrix (criterion "work on training")

Name	No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
A	1			+2	+3												+3		+2				
B	2	+3			+1	+3												+3					
C	3	+2															+3						
D	4		+1			+3												+2	+3				
E	5	+3		+3				+2									+3						
F	6		+2		+2	+2										+1		+3					
G	7													+2									
H	8										+1	+1						+1					
I	9														+3					+3			
J	10																						
K	11																						
L	12																						
M	13										+2	+1											
N	14								+2	+2			+2										
O	15													+1									
P	16	+1		+1	+1																		
Q	17																						
R	18		+3		+3		+1			+3					+3						+3		
S	19							+1															
T	20						+2			+3					+1			+1					
U	21																						
V	22																						

Based on the matrix of choice, sociograms were constructed for the first two elections for each criterion. Consider the results obtained sequentially. Sociogram (Figure 1) allows a comparative analysis of the structure of relationships in a team and gives a visual representation of the intragroup differentiation of team members, taking into account their status (popularity).

Figure 1. Analysis of the communicative situation “With which member of the team do you prefer to work in training?”

Sociogram built on the first two choices of respondents. The first choice is indicated by solid arrows. The second choice is indicated by dash-dotted arrows. The dotted line highlights the subgroups of the most closely interacting team members.

As can be seen from Figure 1, in general, the links in the team are quite extensive. This criterion revealed the highest saturation of bonds. It can be seen that communication links now cover almost all team members, although there are two “isolated” players that no one has chosen as training partners. Figure 2 shows the distribution of popular, medium and unpopular team members according to the “work in training” criterion.

Figure 2. Distribution of popular, medium and unpopular team members by the criterion of “work in training”

According to the survey results, it is possible to single out five members of the collective who are most popular. At the same time, one of them is significantly ahead of the rest in the number of elections received by him as a training partner (10 elections received). Note that the popularity of these five team members was achieved both by the number of elections and by the first elections received, for which an increased score is assigned. Thus, it can be said that there are 3 communicative leaders (P, F, A), whose popularity is based on the breadth of the constructed communicative networks (they received many secondary elections); and 2 leaders (I, N), whose communicative network is narrow, but rather deeply built in terms of efficiency in resolving issues.

The revealed ratio of popular, average and unpopular team members can be called balanced, since usually all these categories are represented in groups. As noted in the works of Franceschet 2017 and Billsberry

2018, leaders are more clearly distinguished in the development process, more members of the group enter the category of average popularity, and fewer people remain “isolated”, falling out of general communication.

At the moment, the team identifies a moderate number of mutual elections on the criterion of “work in training” - 32, which is a normal indicator at the group development stage. Separately, we note that one of the team members has 5 mutual elections, which happens very rarely and means that an entire subgroup has been formed around this person. In Figure 1, four subgroups are distinguished, consisting of 4 members, connected by a large number of internal elections, including mutual elections, and in varying degrees integrated into the group as a whole. It is worth noting that each of these subgroups is included in the most popular team member. On a sociogram, you can see at least two, who can be called integrators located at the junction of two subgroups. Also, in the first two elections, a “chain” is traced, which includes 9 members of the group only in the first two elections.

Next, we calculate the group cohesion index using the formula 1, it was 0.05. It is believed that with the values of this index of about 0.6-0.7 group cohesion is quite high, communication is saturated, there are almost no “isolated” group members. Index 0.05 by the criterion of “work in training” means low group cohesion at the moment.

The analysis of the communicative situation “With which of the team members do you prefer to spend your free time?” is presented in Table 3 and in Figure 3.

Table 3. Sociometric matrix (criterion "free time")

Nam e	No .	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
A	1										1	1	1	1	1	1	1	1	1	2	2	2	2
B	2				+																		
C	3																						
D	4				+		+					+					+						
E	5																						
F	6												+							+			
G	7										+	+											
H	8				+												+						
I	9																		+				
J	10																						
K	11																						
L	12				+		+					+	+										
M	13						+				+		+				+						
N	14						+		+									+	+				
O	15																						
P	16																						
Q	17																						
R	18																						
S	19						+		+														
T	20																						
U	21																						
V	22	+																					

Mutual elections are indicated by solid arrows. The remaining selections are indicated by dashed arrows. By this criterion, in general, there are not very many connections in the team, there are substantially fewer of them than by the criterion of “work in training”. The criterion of “free time” reveals a saturation of emotional connections, for the full formation of which time and informal communication between team members is required. Sociogram is based on the first three choices of respondents. In Figure 3 it can be seen that now the emotional connections do not cover all the members of the team. At the moment, only 5 team members can be called popular and average by the criterion of “free time”, while 8 team members are unpopular or “isolated” in the sphere of emotional connections.

Figure 3. Analysis of the communicative situation "With whom of the team members do you prefer to spend your free time?"

Figure 3 shows the distribution of popular, medium and unpopular team members by this criterion.

According to the survey results, four team members can be identified who are most popular in the emotional sphere (M, D, N, L). They all received about the same number of elections (4-5 elections). The popularity of these four team members was achieved both by the number of elections and by the first elections received, for which an increased score is assigned. However, it is worth noting that, according to this criterion, the number of elections received by popular members is significantly lower than according to the criterion "project". Thus, the maximum number of choices for this criterion is six, while for work in training it is nine.

Figure 4. Distribution of popular, medium and unpopular team members according to the criterion of "free time"

According to the criterion of "free time", a small number of mutual elections is revealed in the team, namely 20. We note that two team members have three mutual choices in the emotional sphere, which is a very good indicator and the first step to establishing strong interpersonal relationships. In addition, this is the only criterion for which there are mutual elections between popular team members. Thus, we can talk about the existence of the emotional core.

Figure 4 shows two large subgroups, including 7-8 people each, connected by a large number of internal elections, including mutual ones. At the same time, only one member of the team (F) is clearly visible, which is the integrator of these two subgroups.

We also note that the question "Who of the team members do you prefer to spend your free time with?" was not answered by the six respondents who were present during the survey, and only four respondents chose more than three colleagues when answering this question. It also confirms the weakness of the emotional connections at this stage of the team's development. Thus, the resulting group picture confirms the fact that the team is dominated by business connections, and later, deeper and stronger emotional connections can be established on their basis. Index 0.03 by the criterion of "free time" means low group cohesion at the moment.

The analysis of the communicative situation “Who can be relied on in a difficult situation in the game?” is presented in Table 4 and in Figure 6.

Table 4. Sociometric matrix (“game” criterion)

Nam e	No .	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
A	1			+							1	1	1				1	3					
B	2				+	+																	
C	3	3															3						
D	4																						
E	5																						
F	6		+												+	+					+		
G	7		+											+	+								
H	8										+	+											
I	9										1	1									+		
J	10																						
K	11	+						+															
L	12																						
M	13							+					+										
N	14							+	+										+	+			
O	15													+									
P	16	+		+				+															
Q	17																						
R	18																						
S	19																						
T	20																						
U	21																				+		
V	22																						

Sociogram built on the first two choices of respondents. The first choice is indicated by solid arrows. The second choice is indicated by dash-dotted arrows. The dotted line highlights the subcommands of the most closely interacting team members.

Figure 5. Analysis of the communicative situation "On which of the team members can you rely in a difficult situation in the game?"

According to the “game” criterion, there are significantly fewer connections in the team than the “work in training” criterion, but somewhat more than the “free time” criterion. It can be concluded that the team members have not yet established such strong business and emotional ties so that they maintain contact after work.

Most likely, strong ties are established when a coordinated and organized team is formed that is able to support effective interaction in conditions of territorial removal. At present communication links do not cover all team members, there is a certain number of “isolated” participants with whom no one is ready to interact in the game.

Figure 6 shows the distribution of popular, medium and unpopular team members according to the “game” criterion.

Figure 6. Distribution of popular, medium and unpopular team members by the criterion of "interaction in the game"

According to the survey results, five members of the team (R, E, I, M, K) can be distinguished who are most popular in the interaction in the game. However, it is worth noting that, according to this criterion, the number of elections received by popular members (4-6 elections) is significantly lower than according to the criterion “work in training”. Thus, the maximum number of choices for this criterion is six. At the moment, only 12 team members by the criterion of “interaction in the game” belong to the subgroups of popular and medium, and 11 participants are unpopular in this area.

At present, only a small number of reciprocal elections are identified by the criterion “interaction in the game”, namely, 18. In addition, even popular team members received as many as two mutual choices by this criterion. The possible causes of such weak links have already been described above.

Conclusions

Thus, the most intense are the communication links on the processes associated with workouts, and the least developed are the communication links in the field of informal communication. Let us give a statistical comparison of the studied criteria, reflecting the breadth of communication: on the criterion “work in training”, the group made 74 choices, on the criterion “free time” - 44 choices, on the criterion “interaction in the game” - 53 choices.

For each criterion, several subgroups can be distinguished, connected by a large number of internal elections, but differently integrated into the group as a whole. Note that the subgroups that are completely separate from the rest of the team are not identified by any criteria. Expressed conflict zones at the moment is not observed. However, few people play the role of integrators, that is, they provide interconnections between different subgroups.

Let us analyze the change in the composition of the most popular team members, depending on the criterion. It turned out that the composition of the popular team members is the same by the criteria of “work in training” and “interaction in the game”, but completely different by the criterion of “free time”. That is, team members prefer to interact on game moments with some people, and spend their free time with others. In addition, the same composition of subcommands popular in terms of “work in training” and “interaction in the game” suggests that respondents do not sufficiently distinguish the features of these processes. In any case, team members who are popular on these two criteria are under the greatest burden when solving communication

problems in a group. As for the criterion of "free time", then we can talk about the presence of the emotional core of the team in the field of informal communication, based on mutual elections in the subgroup popular. It is important that there is one member of the team, which is popular for each of the three criteria, but it is still too early to call him a common leader.

As for the group cohesion index, it is acceptable by the criterion of "work in training," but very low for the other two criteria. This is due to the fact that interpersonal communication in a team is not strong enough. The team would not interfere with training aimed at improving cohesion.

Quite a lot of team members currently fall out of the overall structure of communication. Only two members of the team have zero status according to the "work in training" criterion, while there are 10 such people according to the "free time" criterion, and 6. It is possible to hope that with the development of the team be included in group communication and belong to a subgroup of medium in popularity.

Thus, we can conclude that the socio-psychological climate in the volleyball team of the USUE is quite favorable. Expressed conflict zones in the team is not observed.

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