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ORIGINAL RESEARCH

FORMING WORK GROUPS BY APPEALING TO THE RELATIONAL MATRIX

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Summary

Our study makes use of the interpersonal relationships criteria in order to present an efficient selection method applied inside a work group being part of a congregation; the study is done by means of the relational matrix. Generally speaking, the relation between two members can be unidirectional (when one member wishes to collaborate with another and the latter does not) and bidirectional (when the collaboration wish is reciprocal).

Key words: bidirectional, work group, relational matrix, interpersonal relationships.

Introduction

The group represents an ensemble of subjects involved in interactions and reciprocal dependency, doing a common activity.

Sherif M., quoted by Mureşan A. (2005) defines the group as “a social unit formed of a number of persons involved in status and role relationships, all of these being established after a while; these persons respect common values or norms governing their reciprocal behaviour, at least with direct regards to the group issues.”

Dragnea A (2006) sees “the small group as reuniting a number of people that interact according to individually recognized norms, the purpose being that of reaching more than one goal, common objectives and where the members distinguish by roles, functions or tasks.”

Golu P., quoted by Dragnea A. (2006) considers that man as an individual can only be conceived as part of the whole, as member of different membership or reference groups- representing his immediate environment, as well as the ecological background where man is born, raised and lives his existence. “

The group members communicate among themselves, thus establishing relationships of a particular evolution in time.

On a general basis, one or more groups are formed during each activity, unfolded either in primary and secondary school, or during high-school, university or even scientific activity or research periods; other activities such as performance sport are also to be mentioned here.

Moreno J.L. (2009), the father of sociometrics, asserted that emotional human relationships influence both the building of work groups, as well as work productivity. In this respect he suggested that congregations be built on the sociometrical criteria.

Content

All team members of any work group have to have a common objective for the pursuit of which all of them must necessarily participate. Likewise, each group member must have a well determined role and must obey certain behaviour rules, generally accepted and respected by all the group members.

During the work groups formation process inside any kind of activity, special importance must be paid to the socio-emotional relations with major role in facilitating or preventing the accomplishment of the common initially set objectives.

The selection of subjects with a view to forming work groups must also take into consideration the level of professional training, the social status, interests, psychological and psycho-social criteria, as well as personality traits.

Inside the special field of interest literature, groups are classified function of various criteria. Thus,

- in function of the size of the group, there are large and small groups;
- in function of the normative-axiological function, there are affiliation groups and reference groups;
- in function of the group status, there are formal and informal groups;
- considering the integrality and stability degree, there are natural or organizational groups;
- if we consider the nature of the relationships established in between the group members, there are primary and secondary groups.

Mihu A., quoted by Mureşan A. (2005) depicts sociometrics as a study of the phenomenon of interpersonal choices, function of the interest of the one doing the investigation.

With the purpose of group functionality, three elements must necessarily be present: common objectives, the individual seen as an interacting system, and interpersonal relations in between the group members.

The interpersonal relationships represent a psychical, conscious, direct union based on a complex inverse connection (the past of the interaction subsystems is correlated to their present) that presupposes at least two people. Their interaction must not be seen as static reciprocity, but as a dynamic one, implying the idea of “feedback”, “retroactive interlinkage”, or “retroaction”.

The **purpose of the paper** is constituted by endeavour of determining the optimal number of group members, as well as the organization of groups by appealing to the relational matrix.

Example:

A collectivity of 15 people is used for work group membership selection, the purpose being that of reaching the objectives targeted inside a certain type of activity.

The group selection criteria will be that of the interpersonal relationships established among the members of the selection group, so that the chosen member can also be wanted and accepted inside the group (team) by its each and every member; this chosen person must in his or her turn want each of the other selected persons.

The relational matrix will be completed based on a questionnaire encompassing each member’s appreciation regarding his or her relationship with any other team member.

If a sociogram would be put together in order to illustrate these relationships, 225 lines would have to be visible, which would make the sociogram quite difficult to interpret. This is the very reason why the best solution for assembling the group is that of reducing the relational matrix.

Questionary model:

First and last name: B.M.

■ By analyzing table 1, kindly mention the names of the persons with whom you would like to collaborate in view of a future project.

Table 1

No.	First and last name	Option
		Yes(1); No (0)
1	B.M.	1
2	B.T.	0
3	D.R.	0
4	E.F.	1
5	I.D.	1
6	M.N.	1
7	N.O.	0
8	N.V.	1
9	P.A.	1
10	P.M.	0
11	S.G.	0
12	S.I.	1
13	T.G.	0
14	U.D.	0
15	Z.C.	1

A matrix of 15 lines and 15 columns is realized, a matrix into which the options of the questioned persons are included (as per the bellow model).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	0	0	1	1	1	0	1	1	0	0	1	0	0	1
2	0	1	1	1	0	1	1	0	0	1	1	1	0	0	0
3	1	0	1	1	0	0	1	1	1	0	0	1	1	1	0
4	1	1	0	1	1	1	1	0	0	1	0	1	0	1	0
5	1	0	1	0	1	1	0	0	0	1	0	1	1	1	1
6	1	1	0	0	1	1	0	1	1	1	0	1	0	1	1
7	1	0	0	0	1	1	1	0	0	1	1	1	1	1	1
8	0	1	0	1	0	0	0	1	1	1	1	0	0	1	1
9	0	1	0	1	0	1	0	0	1	1	0	1	0	0	1
10	1	0	1	1	1	0	0	0	1	1	1	0	0	1	1
11	1	1	1	1	0	0	1	1	0	0	1	0	0	1	0
12	1	0	1	0	1	1	1	0	0	1	0	1	1	1	1
13	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1
14	1	0	0	0	0	1	0	1	1	0	1	1	1	1	0
15	1	0	1	0	1	1	1	1	1	0	1	1	1	0	1

The type of relation between one member and the others from inside the group is thus determined.

The relation between two members can be unidirectional (when one of the group members does want to collaborate with another and the latter does not) and bidirectional (when the collaboration wish is reciprocal).

The following annotations are done:

$R_{B.M. \rightarrow R_{m.c}}$ (The relation between subject B.M. and every other group member, as seen by B.M.)

$R_{B.M. \leftarrow R_{m.c}}$ (The relation between subject B.M. and every other group member, as seen by every group member).

$R_{B.M. \leftrightarrow R_{m.c}}$ (The relation between subject B.M. and every other group member, as seen from a bidirectional point of view) = $R_{B.M. \rightarrow R_{m.c}} \cap R_{B.M. \leftarrow R_{m.c}}$

The subject's with himself will be an acceptance relation and will be quoted by 1.

$R_{B.M. \rightarrow R_{m.c}} = 1,0,0,1,1,1,0,1,1,0,0,1,0,0,1$ (unidirectional relationship).

$R_{B.M. \leftarrow R_{m.c}} = 1,0,1,1,1,1,1,0,0,1,1,1,0,1,1$ (unidirectional relationship).

$R_{B.M. \leftrightarrow R_{m.c}} = 1,0,0,1,1,1,0,0,0,0,0,1,0,0,1$ (bidirectional relationship).

The relations between each group member and the collective are similarly determined.

The thus obtained result will be included in a new matrix, to be named: "bidirectional matrix".

After the calculus is done, the resulting matrix is of the following form:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	1	0	0	1	1	1	0	0	0	0	0	1	0	0	1	6
2	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	4
3	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	3
4	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	4
5	1	0	0	0	1	1	0	0	0	1	0	1	1	0	1	7
6	1	1	0	0	1	1	0	0	1	0	0	1	0	1	1	8
7	0	0	0	0	0	0	1	0	0	0	1	1	1	0	1	5
8	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	4
9	0	0	0	0	0	1	0	0	1	1	0	0	0	0	1	4
10	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	4
11	0	1	0	0	0	0	1	1	0	0	1	0	0	1	0	5
12	1	0	1	0	1	1	1	0	0	0	0	1	0	1	1	7
13	0	0	1	0	1	0	1	0	0	0	0	0	1	1	1	6
14	0	0	0	0	0	1	0	1	0	0	1	1	1	1	0	6
15	1	0	0	0	1	1	1	1	1	0	0	1	1	0	1	9
	6	4	3	4	7	8	5	4	4	4	5	7	6	6	9	

The last line and column represent the number of acceptance options, number to be used in simplifying the matrix through reducing the line and column with the lowest acceptance rate. In the case of more lines or columns with the same number of acceptance options also representing the lowest value, the matrix can be reduced by all of these lines and columns at once.

Following the reduction, another matrix results; this matrix is also to be reduced according to the previously mentioned rule. Simplifying the matrix is an operation to be done progressively up until a matrix with no 0 elements is obtained. The matrix thus obtained will represent the optimal work group inside which all members have bidirectional relationships.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	1	0	0	1	1	1	0	0	0	0	0	1	0	0	1	6
2	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	4
3	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	3
4	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	4
5	1	0	0	0	1	1	0	0	0	1	0	1	1	0	1	7
6	1	1	0	0	1	1	0	0	1	0	0	1	0	1	1	8
7	0	0	0	0	0	0	1	0	0	0	1	1	1	0	1	5
8	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	4
9	0	0	0	0	0	1	0	0	1	1	0	0	0	0	1	4
10	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	4
11	0	1	0	0	0	0	1	1	0	0	1	0	0	1	0	5
12	1	0	1	0	1	1	1	0	0	0	0	1	0	1	1	7
13	0	0	1	0	1	0	1	0	0	0	0	0	1	1	1	6
14	0	0	0	0	0	1	0	1	0	0	1	1	1	1	0	6
15	1	0	0	0	1	1	1	1	1	0	0	1	1	0	1	9
	6	4	3	4	7	8	5	4	4	4	5	7	6	6	9	

It is to be noticed that subject 3 had the lowest acceptance rate (3), so that the matrix will be reduced by the third line and column, thus resulting a new matrix.

	1	2	4	5	6	7	8	9	10	11	12	13	14	15	
1	1	0	1	1	1	0	0	0	0	0	1	0	0	1	6
2	0	1	1	0	1	0	0	0	0	1	0	0	0	0	4
4	1	1	1	0	0	0	0	0	1	0	0	0	0	0	4
5	1	0	0	1	1	0	0	0	1	0	1	1	0	1	7
6	1	1	0	1	1	0	0	1	0	0	1	0	1	1	8
7	0	0	0	0	0	1	0	0	0	1	1	1	0	1	5
8	0	0	0	0	0	0	1	0	0	1	0	0	1	1	4
9	0	0	0	0	1	0	0	1	1	0	0	0	0	1	4

10	0	0	1	1	0	0	0	1	1	0	0	0	0	0	4
11	0	1	0	0	0	1	1	0	0	1	0	0	1	0	5
12	1	0	0	1	1	1	0	0	0	0	1	0	1	1	7
13	0	0	0	1	0	1	0	0	0	0	0	1	1	1	5
14	0	0	0	0	1	0	1	0	0	1	1	1	1	0	6
15	1	0	0	1	1	1	1	1	0	0	1	1	0	1	9
	6	4	4	7	8	5	4	4	4	5	7	6	6	9	

After the new re-calculation of the acceptance answers, the lowest acceptance degree is obtained by subject no 2(B.T), 4 (E.F.), 8 (N.V.), 9 (P.A.) and 10 (P.M.). After the matrix is once again reduced by elimination of the lines and columns of the following no-s: 2,4,8,9,10, the next matrix is obtained:

		1	5	6	7	11	12	13	14	15					
1	1	1	1	1	0	0	1	0	0	1	5				
5	1	1	1	1	0	0	1	1	0	1	6				
6	1	1	1	1	0	0	1	0	1	1	6				
7	0	0	0	0	1	1	1	1	0	1	5				
11	0	0	0	0	1	1	0	0	1	0	3				
12	1	1	1	1	1	0	1	0	1	1	7				
13	0	1	0	1	1	0	0	1	1	1	5				
14	0	0	1	0	1	1	1	1	1	1	5				
15	1	1	1	1	1	0	1	1	0	1	7				
		5	6	6	5	3	7	5	5	7					

The acceptance number is once again recalculated, the smallest number (3) being obtained by subject no 11 (S.G.) The newly obtained matrix has the following content:

		1	5	6	7	12	13	14	15						
1	1	1	1	1	0	1	0	0	1	5					
5	1	1	1	1	0	1	1	0	1	6					
6	1	1	1	1	0	1	0	1	1	6					
7	0	0	0	0	1	1	1	0	1	4					
12	1	1	1	1	1	1	0	1	1	7					
13	0	1	0	1	1	0	1	1	1	5					
14	0	0	1	0	1	1	1	1	0	4					
15	1	1	1	1	1	1	1	0	1	7					
		5	6	6	4	7	5	4	7						

A new acceptance recalculation is done and subject 7 (N.O) and 14 (U.D.) are the ones with the lowest acceptance rate. The matrix reduction is thus done by elimination of lines and columns no 7 and 14. The thus obtained matrix is illustrated below.

		1	5	6	12	13	15								
1	1	1	1	1	1	0	1	5							
5	1	1	1	1	1	1	1	6							
6	1	1	1	1	1	0	1	5							
12	1	1	1	1	1	0	1	5							
13	0	1	0	0	1	1	1	3							
15	1	1	1	1	1	1	1	6							
		5	6	5	5	3	6								

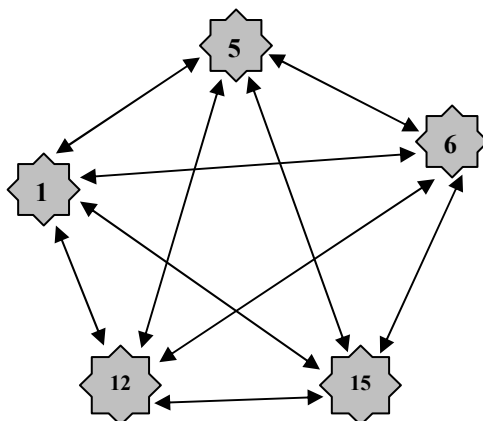
One can easily notice that very few 0 elements have been kept inside the matrix. After recalculation of the acceptance number, subject 13 (T.G.) was the one obtaining the lowest favorable answers. The matrix simplification is done by reducing the 13th line and column. The below matrix is the resulting one:

		1	5	6	12	15									
1	1	1	1	1	1	1	5								
5	1	1	1	1	1	1	5								
6	1	1	1	1	1	1	5								
12	1	1	1	1	1	1	5								
15	1	1	1	1	1	1	5								
		5	5	5	5	5									

The matrix obtained following the reduction no longer contains any 0 elements, which makes the acceptance degree equal. It thus results that all the left members fulfil the bidirectional condition imposed inside the selection process.

It is noticeable that the best formed group from the resulting matrix is that of subjects no 1 (B.M.), 5 (I.D.), 6 (M.N.), 12 (S.I.) and 15 (Z.C.). The maximum group number accepted by all its members must be 5.

The final matrix will be represented with the help of a sociogram to better emphasize the obtained result.



Conclusions:

- The final matrix ensures an objective selection manner of a work group from inside a collectivity, function of the established purpose, on the basis of one or more selection criteria (that of the interpersonal relationships in the present case).
- Building work groups by appealing to the relational matrix essentially contributes to the very efficient fulfilling of the commonly proposed objectives, thus preventing the subject's exclusion especially when this subject is nominated to be part of a group where he or she is not wanted.
- Selecting a greater number of members if compared to the maximum accepted number (5) determined by the relational matrix, does not respect the bidirectional condition imposed in the beginning of this selection process.

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