

Human Resource Management and Organizational Behavior

Cooperation to Make Networks Study Case, Net-Box Game

Miguel David Rojas López, María Elena Valencia Corrales
and Samuel David Rojas Valencia

Abstract Social networks are constantly built in organizations who work in the studio or in coexistence with other individuals. Cooperation between different entities is generated through networks whose goal is to exchange information, improve performance and optimize resources. The game called Net-Box shows how networks are built from similarities and the cooperation emerges as a structure, allowing a common goal. The software UCINET, is constructed from data collected in playing sessions applied at the Nacional University of Colombia, Medellin. Finally, the results are presented and the conclusions on the structure of the networks are documented.

Keywords Social networks · Cooperation · Games · Interdisciplinary · Ucinet

1 Introduction

Currently, organizations adapt to the environment influenced by Information and Communication Technologies—TIC's—(Tecnología, información y comunicación, by its Spanish acronym). According to the particular interest of each one and their preferences, networks are groups with a defined objective form. These social networks are structured in different stages over time, achieving strengthens links between different nodes.

M.D.R. López · S.D.R. Valencia (✉)
National University of Colombia Medellin, Medellin, Colombia
e-mail: sdrojasv@unal.edu.co

M.D.R. López
e-mail: mdrojas@unal.edu.co

M.E.V. Corrales
Fundación Universitaria Luis Amigo, Bogota, Colombia
e-mail: Maria.valenciaco@amigo.edu.co

With the methodology of [1] it is created the Net-Box game where participants form a network in four stages according to the different characteristics and is designed with given instructions.

The information collected called Ucinet, feeds the software and it initially generates a graphic with information showing the result of the network built.

2 Conceptual Framework

2.1 Social Networks

In 1954 the anthropologists J.A. Barnes use for first time the term social network, to describe the relationships between the Norwegian fishing of a village. Kadushin [2], define a network as a set of relationships. More formally a network is composed of nodes in mathematical terms and a description of the relationship between them. The relationship between nodes can be unidirectional, where it does not exist a feedback or is bidirectional, where both nodes receive feedback information. A node is an object that makes up the network. Interaction between nodes is usually represented by a graphic. In Fig. 1 the graph with 3 nodes and one- and bidirectional relationships observed.

As is expressed by Benito Zafrilla [3] complex networks are presented in all parts of nature, society and biology, neurology, communications and computing. In Fig. 2 the present relationship between complex networks and social networks is shown, which include human behavior, while the other networks is absent.

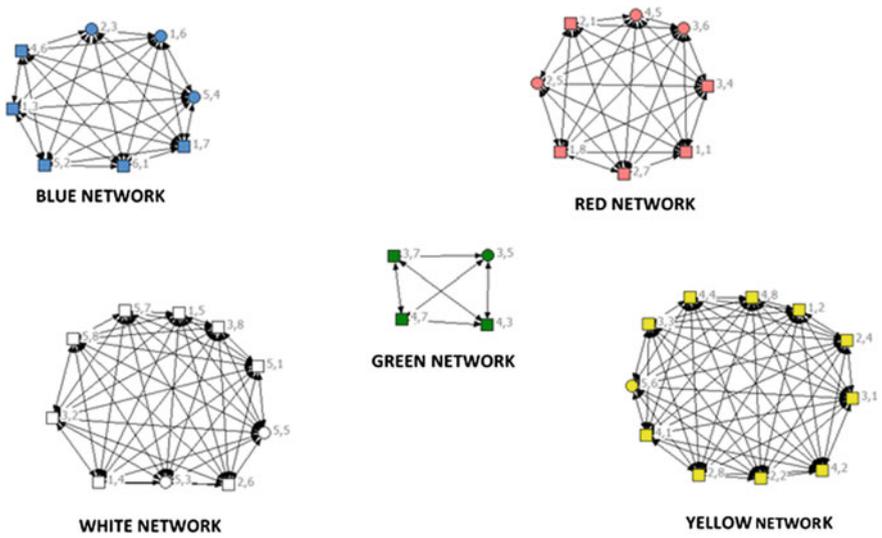


Fig. 1 Graphic

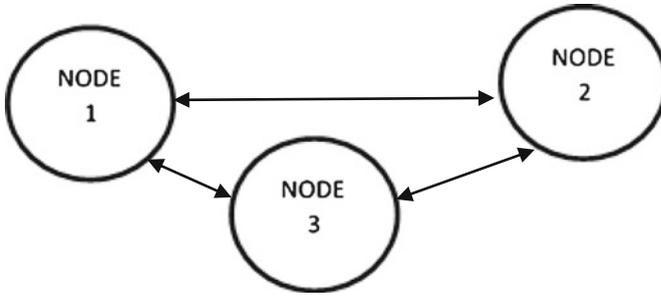


Fig. 2 Relation of complex networks—Social

Social networks are defined as a set of actors—individuals, groups, organizations, communities, global companies, among others. Linked with each other by a relationship or set of social relations [4]. An essential feature for the formation of a network is raised by Madrid [5], explaining that social actors form a line to the similarity of their objectives, projects or sympathies network. Currently, the social network analysis acquires a significant role in theories concerning the creation and distribution of information by individuals within the organization that builds the network [6].

2.2 Compete, Collaborate and Cooperate

The steps for building networks can start competing. Johnson and Johnson [7] speak of two key types of competition; constructive and destructive. In constructive competition winners care about learning from the losers, ensuring that they have more knowledge before competing. Destructive competition wins in self-interest above seek mutual learning between the parties.

Then, it is expected that the parties evolve to collaboration. According Gros and Adrian [8], collaboration is a process of constant interaction in problem solving, project development or discussion about a particular topic; where each participant has defined the role in achieving shared learning, and where the counselor involved as a mediator, ensuring the effectiveness of collaborative activity.

In conclusion, the parties understand, that to achieve the objectives Guitert and Gimenez [9], cooperation is necessary, argue that performs cooperative learning when a reciprocity between a group of individuals who can differentiate and contrast their views given such so they come to generate a process of knowledge construction. It is a process in which each individual learns more in a group than what he would learn by itself, the result of the interaction of team members.

In Fig. 3 is shown as the first step in a relationship is competition, and then appear interactions initiating the collaborative process and evolves with multiple interactions toward cooperation.

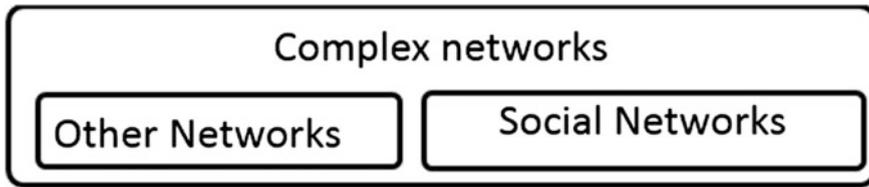


Fig. 3 Compete, collaborate, and cooperate

Table 1 Shows the steps of the methodology

Steps	Description
1	Identify the topic of the game
2	Establish the porpoise of the game
3	Set the goals of the game
4	Identify y define the general concepts of the topic
5	Select the applicant techniques
6	Select the proper technique, in base of the character of the game
7	Incorporate the specific knowledge of the game
8	Develop pilot sessions of the game
9	Develop the final version of the game
10	Elaborate a survey to evaluate the game

3 Game Design Net-Box

From the methodology proposed by Gomez [1], the game design Net-Box was performed.

Table 1 Metodology for the design of the game.

The game aims to structure social networks showing the aforementioned steps in building networks; competition, collaboration and cooperation.

To teach the process of building networks, the first step is that each individual selects a square of colored paper, which in this case is the common theme that has. Follow by the instructions given proposed, an individual activity, then in pairs and then connect four players finally able to build a network of 8 participants where all have something in common.

Networks are structured according to the color distribution where each participant is an element according to the instructions given, which is part of a complementary module to another and this in turn is part of a larger element.

4 Results

Table 2 shows the location of each color of the participants of the pilot test conducted at the Facultad de Minas.

Table 2 Color location

	1	2	3	4	5	6	7	8
1	r	a	z	b	b	z	z	r
2	r	a	z	a	r	b	r	a
3	a	b	a	r	v	r	v	b
4	a	a	v	a	r	z	v	a
5	b	z	b	z	b	a	b	b
6	z							

Fig. 4 Networks representation made by UCINET

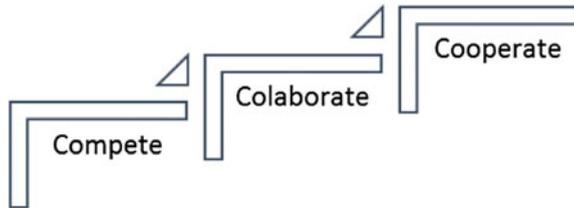


Figure 4 shows the networks built by the UCINET program with binary information provided by the Excel.

Each network is constructed with nodes of each color, blue nodes (z) are attached on the stages, and in the graphic the coordinated location is reordered.

5 Conclusions

- The selection of random color is what defines the structure of the network which can affect the results, causing a large network such as yellow and one with few nodes as the green one.
- Initially, in the first instruction, each individual built the box assuming compete against others, but after the second round, it understood that should work together to collaborate and further cooperate.
- The players understood that if they did not work properly in the first stage, the interaction with the other built elements generate problems in the joint network, which led to an ongoing review of the structure of the box.
- Initially, the gender factor did not affect the consolidation of the network, because it was not a stated objective in the game.

References

1. Gómez Álvarez, M.C.: Definición de un Método para el Diseño de Juegos Orientados Al Desarrollo de Habilidades Gerenciales como Estrategia de Entrenamiento Empresarial. Universidad Nacional de Colombia (2010)
2. Kadushin, C.: Introduction to social network theory. *Networks* **63**, 60 (2004)
3. Benito Zafrilla, R.M., Cárdenas Villalobos, J.P., Mouronte López, M.L.: *Redes Complejas: El nuevo paradigma* (2007)
4. Lozares Colina, C.: La teoría de redes sociales. *Pap. Revista Sociol.* **48**, 103–126 (1996)
5. Madrid, E.P.: Las redes de conocimiento y las organizaciones. *Rev. Bibl. y Technol. la Inf.* **2**, 23 (2005)
6. Pacheco, M., Antonio, L.: Redes sociales y Gestión de la Información: un enfoque desde la teoría de grafos. *Ciencias la Inf.* **43**(1), 29–37 (2012)
7. Johnson, D.W., Johnson, R.T.: The impact of cooperative, competitive, and individualistic learning environments on achievement (2013)
8. Gros, B., Adrian, M.: Estudio sobre el uso de los foros virtuales para favorecer las actividades colaborativas en la enseñanza superior (2004). http://campus.usal.es/teoriaeducacion/rev_numero_05/n5_art_gros_adrian.htm
9. Montse Guitert y Maria Pérez-Mateo.: La colaboración en la red: hacia una definición de aprendizaje colaborativo en entornos virtuales. *Teoría la Educ. Educ. y Cult. en la Soc. la Inf.* **14** (1), 10–31 (2013)