# BAVELA´S GAME: A VIRTUAL APPLICATION

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## ABSTRACT

*Several studies have been made about the communication process and its importance within organizations and teams. Alex Bavelas is one of the authors who first study how ways of communication influence the performance of teams as well as the efficiency in communication processes. Bavelas developed a study based on the application of a game, finding interesting results related to the communication process. This paper seeks to analyze the communication process based on Bavelas' work but using virtual tools. A virtual Bavela´s Game is proposed, in order to simulate some aspects of the original game and to determine the structures of communication and the type of information that best fitted within work teams.*

## INTRODUCTION

An enterprise's main objective is to guarantee a confident, efficient and effective performance. In order to achieve this, each organization has specific tools; one of these, without doubt, is the communication process and its proper management.

When a particular job needs to be done by a group rather than a single person, it has been observed that groups tend to conform patterns of communication that allow the most rapid and successful flow of ideas, information and decisions. Confidence is only necessary and it is shown under an uncertain and risky environment. Before taking the risk about losing something important and be depending of exploitation of the vulnerability by someone who already have the information, people who are going to give information to somebody, must be willing to be vulnerable to the confidence to be useful (Emurian, H. & Wang, Y. 2005), (Rojas, M., Arango, P. & Gallego, J. 2009).

In groups free from external control, the interaction patterns that emerge and stabilize the social product of the process are there within the group. However, the group that exists as part of a larger organization is seldom free to make such an adjustment. Most organizations consider that it is important to express the communication pattern in order to work towards effectiveness (Bavelas, A. 1950). For this kind of groups (free from external control) the confidence could be classified as generalized confidence which is confidence in people itself; and particularized confidence which emerges between people who have narrow ties (Rojas, M. & Marin, J. S. 2005).

As Borgatti (Borgatti, S. [cited February 13 2012]) says, the organizational chart of a bureaucratic organization can be thought of as a network, which represents a social relation that tends to channel a lot of the communication within an organization. Different kinds of information flow through the communication process, such as **prescriptive** information (do this, stop doing that) that flows downward along the links, while **descriptive information** ('this is the status of such-and-such project') flows up the links, often in the form of reports or presentations. The organization also determines a lot of other communication as well; most roles (jobs) within an organization are interlinked, forcing occupants of those roles to interact with others playing their own roles. For example, people in the marketing research department work closely with people in their same department, but they also work with others, such as those in the new product development department.

In this way, other studies about this issue affirm, "the organizations exist in the interpretative process of its members". This statement shows the important role that communication plays in organizational development. Taking this into account and given that there are many ways to coordinate an organization, the question arises of

How the pattern of communications within the organization affects it's performance? (Borgatti, S. [cited February 13 2012])

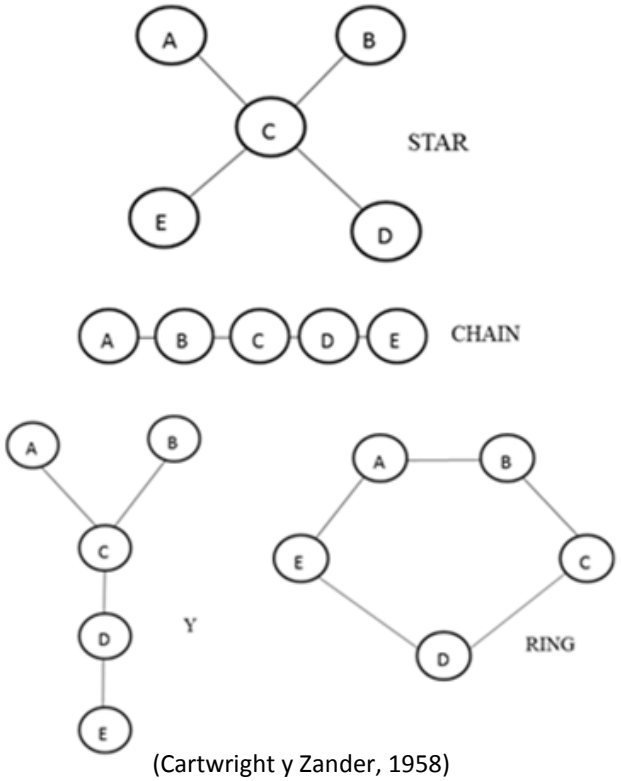
Focusing on this question, Alex Bavelas (Bávelas, A. 1952) and his student Harold Leavitt at Massachusetts Institute of Technology (MIT) developed a research in the late 1940s and ´50s, seeking to determine if it makes any difference who may communicate with whom. This study is embodied in the paper "Communication Patterns in Problem-solving Groups."

The communication processes are inefficient and in many cases form the bottlenecks in the performance of an organization or a group. According to the studies mentioned above, the communication structure adopted and its complexity have a significant influence on communicational success. (Borgatti, S. [cited February 13 2012])

In order to study these approaches from a scientific perspective, through a formal statistical model that validates the results, the analysis was done based on experiment design theory. This study aims to find out if the type of structure and the level of information complexity, each separately, have an influence on the success of the communication, and whether or not there is a significant interaction between these.

## BAVELAS' GAME

### EXHIBIT 1
### COMMUNICATION STRUCTURES




(Cartwright y Zander, 1958)

Alex Bavelas (Bavelas, A. 1952) and his student Harold Leavitt developed an experiment applying a game that consists in each member of an established group of five people receiving one of the five cards for each group. Each of those cards has five symbols, arranged so that each symbol appears on four of the five cards, but only one symbol appears on all five cards.

The game participants are instructed to identify which symbol is found on all five cards, with the aim being to accomplish this task as quickly and efficiently as possible. In order to communicate with each other, the players have to use written messages and follow a previously assigned structure. The game designers proposed four communication structures, intended to analyze some potential significant effect on the communication process.

They studied the structure based on "distance," defined as the distance between the members positions according to the structure assigned. According to these results, the ring should have been the fastest. However, the experimental results were exactly the opposite. Given this finding, Bavelas and Leavitt began to think about another factor: centralization. The more centralized a structure is, the better it performs. They used "centralization" to refer to the overall distance between outlying nodes and the most central node, which acts as an information integrator. The closer each game participant is to that integrator, the faster the puzzle is solved.

Additionally, Communication is the transmission of signals by a common code to the sender and the receiver, and is a daily activity in personal and organizational levels.

Since communication is a complex and critical process within organizations and even in people's daily life, a poor communication process can lead to confusion and misunderstandings between the subjects involved, producing discussions and bad environments to develop daily activities, at work or in personal life.

Communication also depends on the place it is originated, on the signals or ways used to practice it, on the actors and variables involved. There are physical and verbal barriers that directly influence the efficiency and effectiveness of the process.

Based on Bavela´s work, a virtual game was developed in order to simulate some aspects of the original game and to determine the structures of communication and the type of information that best fitted within work teams.

## COMMUNICATION PROCESS

Communication as a fundamental process in a person's life and in their daily activities has been broadly defined and characterized by different authors. Thus, more than 160 different definitions for communication could be found in literature (Hampel, J. 2006) as it is understood differently depending on the field of study it is applied, for example: communications in technology, in social sciences or in engineering, have different definitions and interaction

processes.

Communication is defined by (Hampel, J. 2006) as the transfer of information; that is, a communicator sends a stimulus, a message, some data or information to a receiver. In social sciences, communication is defined as a way of social interaction. Additionally, communication is conceived as "the lifeblood of any system of human interaction as without it, no meaningful or coherent activity can take place" (Ochieng, E.G. & Price, A.D. 2010).

But in teamwork, communication is the way to transfer information. This refers to some instruments as performance reports, recommendation of corrective actions, organizational processes and updating (Johannessena, J. & Olsen, B. 2011). All of these are necessary for good internal relationships between team members and external relationships with the environment, to maintain the possibility of a continuous feedback.

Communication process could be a lineal process, that is, unidirectional, causal, privileged and restricted flow of information. Communication process is unidirectional because the person who transmits the information (The source or transmitter), is the principal actor of the process. It is causal because the transmitter is the person that causes an effect on who received the information, and not the other way around. Is privileged because the transmitter is the owner of information and who determines the amount of information or detail to be transmitted. Finally, the flow of information is restricted, because not all the team members can access the same information and the same amounts, and is lineal, because transmitter has access more and better information than other members (Hellriegel, Slocum & Woodman 1999).

## DESCRIPTION OF THE GAME

Virtual Bavela´s game studies the efficiency of team's communication in the structures proposed by Bavela´s, by measuring the time to find the correct figure in each structure and with different complexity of information. Common information to be found by the team members is given in three levels of complexity, first, simple information, second medium information and third complex information, in each given communication structure. The following are the characteristics of the virtual game: (see Exhibit 2)

Virtual Bavela´s game was designed in 2013 at Universidad Nacional de Colombia, research group CINCO. First, participants must register in the game platform, with their names and a given IP.

When all teams are formed, the game starts with the structure of chain. All participants have to choose the position that want to occupy into the given structure. Participants should take into account that only participant E can select the common figure of the team, and each participant can only communicate with the partner that has a relation in the chain structure, for example, participant A, can only communicate with participant B, and Participant C, can communicated with participant B and E.

Once all participants have chosen their position in the given structure, the game starts at the same time for all the formed teams, and time begins to run. The time that takes each team to find the common figure in each level of information complexity and in each communication structure it measured.

All communications during the game are done by chat, and participant E cannot guess the common figure, because all participants must send at least one message to their teammates, before the participant E choose one answer. If there is a failed attempt, participants must return to communicate with each other, before choosing a new alternative. When participants find the common figure, it continues to the next level (medium information) and

## EXHIBIT 2
## CHARACTERISTICS OF THE VIRTUAL BAVELA´S GAME

| | |
|---|---|
| Number of participants | 5 per group |
| Structures | Chain<br>Star<br>Ring<br>Y |
| Objective | Discover and determine which figure is common amongst the five participants, using written language (By chat) and following a previously assigned communication structure. |
| Purpose of the game | Measure the time of each team in each structure and with each information levels. |
| Start of the game | The game starts when all participants are organized in groups of five people. Once the game starts, no new participants can enter. |
| Winning team | One per structure, the team with less time. |

## EXHIBIT 3
## PLATFORM TO START VIRTUAL BAVELA´S GAME


finally with complex information, but keeping the same structure.

Once participants pass all levels of information in the chain structure, they continue with the ring, the Y and finally the star structures, always measuring the time it takes to find each common figure and the restrictions of communication and guessing. In each structure, participants must choose the position they want to occupy, because a participant that choose the answer (Participant E), may be different in each round.

A game administrator was created in order to obtain the names of participants of the teams, the positions that they occupied in each structure and the time it took to find the common figure in each structure and level of information. That times are analyze to determine which team had the best performance in each structure.

## CONCLUSIONS

This is an initial approach to the virtual Bavela´s game, allowing to show an alternative game to evaluated communication structures and complexity of the information to be transmitted by participants of teams, and a tool to determinate which of the structures in the best to improve the performance of work teams.

The virtual game is an academic proposal for organizations to improve the efficient of work teams and to determine the best participants for projects or specific areas.

Initial tests of the virtual game had been done in order to determine errors and specific aspects to improve, principally by surveys and by obtaining a feedback of participants and results. As future work, we expect to test the game in different environments as organizations, schools, universities, among others, to find a pattern of behavior that allows concluding about the best structure to use in specific communication situations.

The Center for Research and Organizational Consulting CINCO is a research group at Universidad Nacional de Colombia. While the University promotes the research, investigations are done using their own resources, without external finance.

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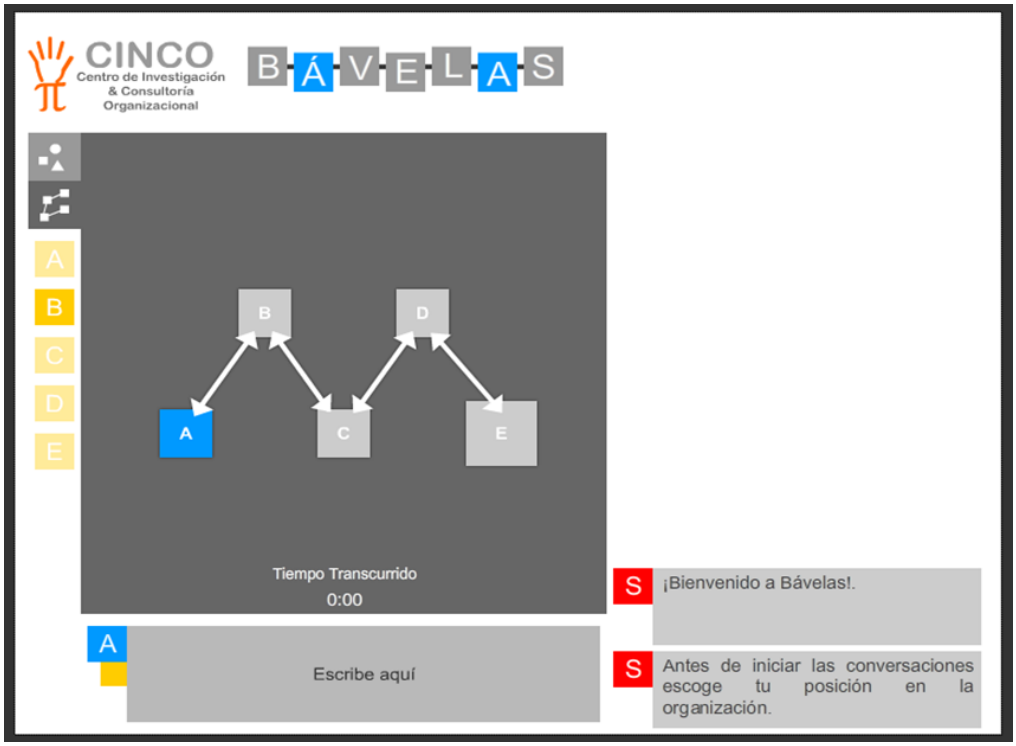
## EXHIBIT 4
## SCENARIO TO CHOOSE POSITION IN CHAIN STRUCTURE

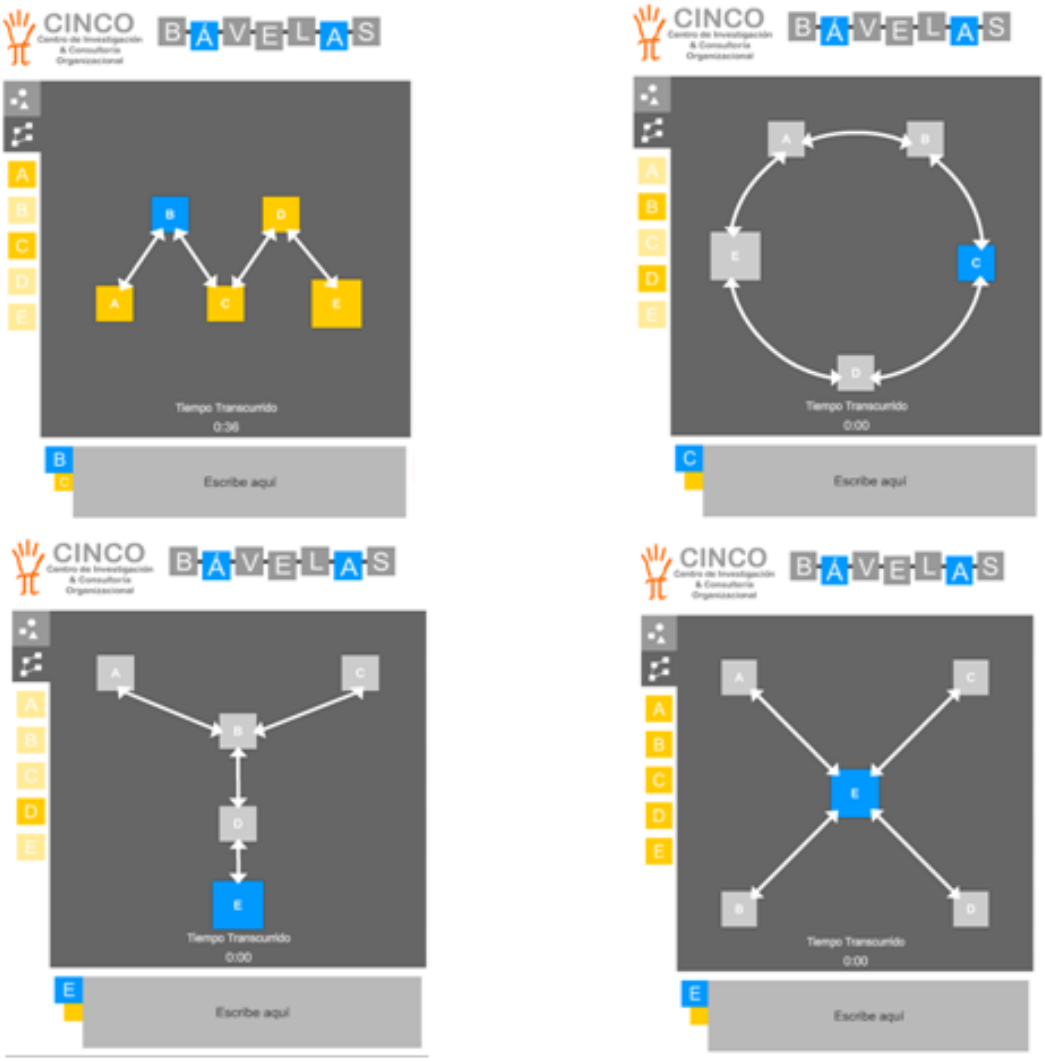



## EXHIBIT 5
## START OF THE GAME, WITH SIMPLE INFORMATION

**TABLE 5**
**Sets of Activities to be Simulated in Each Phase**


**EXHIBIT 6**
**MEDIUM INFORMATION IN CHAIN STRUCTURE**

## EXHIBIT 7
## COMMUNICATION STRUCTURES IN VIRTUAL BAVELA´S GAME




## EXHIBIT 8
## GAME ADMINISTRATOR

Grupo:Camilo,Sebastian,Daniela,Alberto,Luis 16

| | Facil | Medio | Dificil | A,B,C,D,E |
|---|---|---|---|---|
| Cadena | 2:54(4) | 0:13(3) | 0:35(4) | Luis(a),Camilo(b),Sebastian(c),Daniela(d),Alberto(e) |
| Estrella | 0:08(3) | 0:01(0) | 0:02(2) | Alberto(c),Daniela(b),Camilo(a),Luis(e),Sebastian(d) |
| Y | 0:02(0) | 0:03(2) | 0:03(3) | Alberto(e),Daniela(d),Sebastian(b),Camilo(c),Luis(a) |
| Circular | 0:05(4) | 0:12(3) | 0:14(0) | Alberto(e),Daniela(c),Sebastian(a),Camilo(b),Luis(d) |