First International Conference on Design Creativity, ICDC 2010
29 November - 1 December 2010, Kobe, Japan

Social Relations as the Key for Design Team Effectiveness

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Abstract. The aim of this study is to analyze the social relations between team members and their interactions during the application of a design methodology, to develop guidelines for the improvement of team effectiveness. This paper presents the initial phase of the project, responsible for gathering data about metodhologies used by design teams in real companies. Based on this research, several teamwork guidelines will be derived in order to improve the team effectiveness concerning the quality and level of their collaborative interaction.

Keywords: team interaction, social relations, design methodology

1 Introduction

As a creative process, design is an activity that requires a constant seek for solutions and strategies for design problems, and involve many participants, goals and needs. In this respect, design can be described as a complex phenomenon where the parts have "many relationships and several interactions, producing combined effects that are not easily predicted and may often be novel." (Thomson, 2005). While these interrelated activities take place, designers need to provide and receive information to increase the knowledge and reduce the uncertainty levels of the design solution.

In order to understand the world and find solutions, designers need to work together in teams, interact and dialog with different areas of study. Cohen & Bailey (1997) define a team as "a collection of individuals who are independent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger social systems, and who manage their relationships across organizational boundaries."

The designers share some mental models, which "enables them to form accurate explanations about the task, and to coordinate their actions and adapt their behaviors to the demands of the task and other team members" (Doorn, 2007). He found that it is essential for the team to have a shared mental model that are very specific to situations and change over time in order to make available the roles, knowledge and responsibilities, especially when the teams require a high interdependence among the members. At the same time certain methodologies are followed while building these models and being affected by the social relations with other team members. As a result the whole team interaction and performance is effected.

Klimoski and Mohammed (1994) proposed that "a human observer needs to analyze a team's compositional characteristics and its mental models to understand the team effectiveness in terms of its social dynamics. Any visualization methods for representing the social dynamics of teamwork should thus attempt to represent: (1) the interdependent, socially defined connections between team members, and (2) the contents of the team's mental model itself."

In order to facilitate the sharing and achievement of solutions through design process, designers use a Design Methodology by "providing insights into the process, structure, rules and methods and by proposing general strategies of solving problems independent of a branch of industry" (Badke-Schaub, et al., 2005).

Dubberly (2005) published an electronic book where he relates over one hundred methodologies used since 1920. But how do these methodologies relate with the real practice of design? Are they considering the social relations between the team members? Do they cover the projects needs? How are the companies designing nowadays? What does really affect teamwork?

1.1 Complex Systems Science

The Complex Systems Science studies how dynamics of real systems arise from the interaction of individuals and their environment. When systems, in response to the environment, change their behaviour to achieve a goal, they are classified as Complex Adaptive Systems (CAS). (Siebers, 2007) The aggregate objectives (when a system behaviour emerges from the behaviour of its components) are able to anticipate outcomes

(when there are regarded future outcomes from the expectations of intelligent agents involved) and evolve over time (when the system adapts to a changing environment).

Currently, CAS has drawn the attention of the design community, due to its important contributions in various design fields of study, such as Design Process, Creative Design, Co-Evolutionary Design, Participatory Design and Interaction Design. The understanding of design as a process that leads to solutions makes it a complex system itself and an essential part of a higher level activity when dealing with emergent dynamics and properties, while searching for solutions of complex problems.

1.1.1 Small Groups as Complex Systems Theory

The SGACS theory comes from a social psychological heritage which takes an eclectic approach of theory synthesis. It builds upon research into groups as information processing systems (McGrath, 1998), bringing together 13 streams (Arrow et al., 2000). The scope is limited to small groups, normally working with less then 20 members, and classifies them into teams, task forces, crews and social groups. The theory is composed of bottom-up analysis that models the group composition and an upper layer of emergent features that characterizes the group as a system.

The related work (with or without an external organizer) is composed by teams, task forces and crews. The social clubs, societies, friendships and clans, compose the socially motivated goals. Some measurements emerge from this system, such as: motivation, social cohesion, shared beliefs and mental models, goals, satisfaction, performance and so on.

As a complementary study of the social aspects between the design team members (that we will call agents from now on), channels and patterns can be determined by a network graph of inter-agent communication using the empiric method of analyzing messages and/or discourse. The dynamics of roles, tasks, agents and their level of knowledge, skills and abilities will help to determinate how well the human resources are cohesive and fit the needs of the tasks and project objectives.

2 Research Core

2.1 Methodology

This applied kind of research characteristic intends to generate knowledge about social relations and interaction on design teams from the perspective of complex systems and apply the results to problem solving. It has a qualitative and bottom-up approach that considers the inseparable aspects of emergence and its involved units, which can only be understood by means of systematic theorization, observation, description and relation.

This study proposes that the connections and social relations between team members have a direct effect on the performance of the team and the final results. So the methodology used by the team will have a better result if it increases these connections and takes into consideration the social relations between the members.

The research is divided into three main phases:

- 1st (Preliminary questionnaire): where some members of the company gave basic information on how the company works.
- 2nd (Interviews): where members participating on the next phase (experiment) will be individually interviewed. This will generate data about their personality, perceptions, social relations and some details about the design process.
- 3rd (Experiment): where the team members of three companies (Brazil, India and Japan) will be videotaped while going through their design process. This will generate data about their interactions and solutions.

This paper contains the partial results of the project's first phase, which consists of the application of an online questionnaire and its analysis. Thus, the questions on this phase of the research were: Which methodologies do design companies use? What kind of specialists they have in the design teams? How they think the teamwork can be improved?

2.2 Methods

The critical dialectic method of scientific investigation will guide this study considering the dynamic interactions in complex systems, beside the dialethic relations between the design methodologies in their standing context.

2.3 Approach

This phase of the project by means of an exploratory approach had the aim of gathering information on how the design companies of these countries work and what kind of methodology and methods are used. The companies were chosen by the access granted to this kind of information, their size and activities (that varies a lot from one to another). The analysis will try to find characteristics and patterns and also make a profile of the companies that will participate on the experiment.

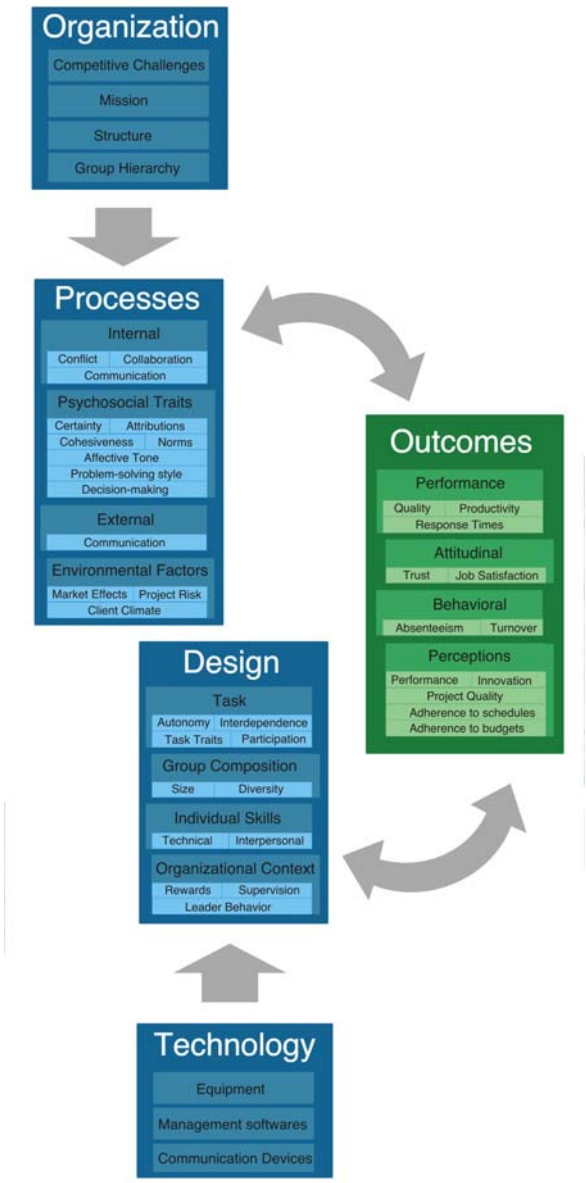

Fig. 1. A heurictic model of group effectiveness

Effectiveness will be taken as the accuracy and completeness of tasks while using a system to achieve an overall goal, which will reflect positively on the productivity and employee satisfaction. The measures of work teams effectiveness (variables) that will be collected (figure 1) are: *design* (task group composition, individual skills), *processes* (internal, external, environmental factors, psychosocial traits), *technology* (equipment, management software, communication devices) and *organization* (mission, structure, competitive challenges, hierarchy). The following *outcomes* will also be measured and related: performance, perceptions, behavioral and attitudinal.

Suggestions on how to improve the teamwork will be added as complementary information to help further activities.

2.4 Tasks

Once we will observe the companies working with their own methodologies and methods, we will not impose specific tasks. As a design group and for the results we had during the first phase, some of the expected design tasks are: recieve a briefing from the client, gather the group, brainstorm, distribute work among the members, develop the ideas and concepts for the project, create the product or service, prototype, check the client acceptance, make corrections and modifications, and deliver.

2.5 Participants

During the whole research we will be studying *work teams*, identified by Cohen & Bailey (1997). They describe the work teams as "continuing work units responsible for producing goods or providing services" that have stable, full-time and well-defined memberships.

Once the experiment will be done in Brazil, India and Japan, the online questionnaire had versions in three different languages (Portuguese, English and Japanese) and was answered by companies in those specific countries. We had an amount of 24 people from 21 participating companies, being 11 Brazilian (Abril Digital, Asces, Corisco Design, Katiaflávia Design Publicidade, Nokia Institute of Technology, Herbert Perman Design, Make Wish Entertainment, Meantime, Nuvon Comunicação, Safh and Tec-Brazil), 04 Indian companies (Apparatus Media Lab, CoDesign Box, Idea Spice Design and Quicksand) and 06 Japanese (Kawasaki, Oki, Yazaki, Toshiba, Sanyo and Canon).

Table 1. Average number of employees

Companies	Average Num. of Employees
Brazilian	197
Indian	12
Japanese	31,380

It is very important to notice the large difference among the average sizes and number of employees of the participating companies among the three countries (table 1) While the Japanese participating companies have an average of 31.000 employees (that are divided in different branches and departments), the Brazilian

companies have an average of 197 and the Indian of only 12. These data make a big impact on the way each of these companies organize their human resources and the teamwork interaction.

The team members were instructed to answer alone (not consulting other members) and give their point of view on the given questions. We had open questions about the company (name, location, activities), the members (name, position, daily activities and way of working) and the team (specialties, activities, methodologies). In the end we asked them how the teamwork could be improved and what could be done to achieve better results.

3 Results

3.1 Methodology

Individually, as the team members have different positions and activities in the company, the methodology varies a lot. Each person has its own and very dynamic way of working, and changes the behaviour according to the goal that needs to be fullfilled.

However, the methodology used by teams, even in companies from different environments and cultures, sizes and activities, is very similar. Table 1. describes the main steps followed, in order, by the companies, with the specification that was identified in the larger amount of answers.

An interesting aspect observed was that in the Brazilian participating companies that do not have a design team, or very small ones (with less then 4 members, sometimes only with one), no methodology is used. Some companies did not mention any methodology and described methods or social relations with stakeholders.

Two of the Brazilian companies have Scrum as their methodologies. "Scrum is an iterative, incremental framework for project management and agile software development" (Wikipedia, 2010), based on sprints.

Mostly all of the questionnaires were filled by directors and managers, and not by the whole design team as asked. So the comparative analysis of the team member's answers to find cohesiveness on their preliminary mental models could not be accomplished.

It's important to emphasize that companies can have a complete different methodology practice, even claiming theoretically that they work in a certain way.

Table 2. Sequential steps used by design companies

	Brazil	India	Japan
Understand	(project overview)	(project overview, listen and observe)	(market tendency, listen)
	x	x	x
Research	(to gain information)	(for insights and learning)	
	x	x	
Concept	(briefing)		(guidelines)
	x		x
Design	(Idea Generation & Development of chosen solution)	(Idea Generation & Development of chosen solution)	(Idea Generation & Development of chosen solution)
	x	x	x
Production	(of final solution)	(of final solution)	
	x	x	x
Deliver	x	x	x

3.2 Methods

Some of the methods (that will be detailed and analysed further in the project), mentioned by the companies were: brainstorm, sketching, information mapping, scenario writing, storyboard, online user questionnaires, paper prototyping, heuristics, media documentation, ethnographic research and gdrlab (card games).

3.3 Teamwork

The participants confused their personal way of working doing their own activities, with the methodology used by the team. This shows the inexistence of known boundaries by the designers of their roles as individuals and as team members, which reflects directly on the team's cohesiveness.

The suggestions made by the participants on how to improve teamwork and have better results are listed below:

- Less interaction among different project teams
- Stretch the designers
- Transparency of information and processes/roles
- Make information visible, flexible and comfortable
- Improve Communication (internal and external - with clients, users and stakeholders). Use mobile technology & internet
- Improve Collaboration through creative techniques
- Improve Emotional Comfort
- Members should help more each other
- Have well determined objectives and deadlines
- Include a studio manager and a strategy positioning specialist in the team, to handle work traffic
- Share information, problems, difficulties, ideas
- Have bigger teams
- Define the method that will be used
- Generate more and different solutions
- Make an archive of previous projects (processes, mistakes, solutions)
- Divide the activities among the team members in a better way
- Have a good process management
- More interaction between the team members during conceptual phases
- Have specialists of other areas in the team (not only designers, communication and art related people)
- Have a product backlog
- Have a web system to keep the creative content from the conceptual phase
- Use a management software for projects
- Improve the time dedicated for each project
- Try out projects in unrelated media

3.4 Team members

The companies listed the specialties of their team members to show what kind of professionals they work with and put together during a design process as members of a team (table 3). The information here does not have any particular order.

Table 3. Specialties of the teams descibred by the companies

Brazilian	Indian	Japanese
Creative Director Graphic Designers Programmer	Creative Director Graphic Designers Programmer	
User Experience Designer	User Experience Designer	User Experience Designer
Information Architect	Information Architect	
Design Manager	Design Manager	Design Manager
Ergonomics Researcher	Exhibition Designer	Ergonomic Designer
Usability Researcher	Interaction Designer	Usability Engineerer
Production Coordinator	Business Strategy Specialist	Kansei Engineer (emotional engineer)
Scrum master Game Designer	Film-Maker Rich-Media Techn.	
Engineer 3D specialist Musician	Branding Spec. Strategy Specialist Print Media Spec. Photographer	Engineer
Ilustrator Webdesigner	Product Designer Space Designer Content Designer	Product Designer
	Web Strategy Specialist	User Interface Designer
	Qualitative Researcher	

The results show that the Indian participating companies have a larger range of specialists and the Japanese ones have a smaller variety are more technical (having basically only engineers). Nevertheless the Japanese companies are more focused on products and have separated departments (design, marketing, production etc) bound together only by the design manager. So they have some of the specialists

of the other mentioned companies, but not working together as a multidisciplinary team.

4 Conclusion

This paper described some methods and methodologies used by companies and the suggestions made by their team members on how to improve teamwork and have better results. One of the main contributions of the following research is to relate the team effectiveness with the team member's social relations, from the point of view of small groups as complex systems. Which means that it comprehends the use of methodologies with emphasis on human relations and interactions.

The data collected during the first phase will help to understand the effectiveness of different teams. The use of multiple measures and variables will help to compensate for weaknesses in any singular approach.

The main contribution of this research is to study "real teams" in field, making not only theoretical studies and scientific measures but also collecting data through video documentation. Once teams are embedded in larger social systems that influence how they perform and behave, the study of groups in context respect the systemic levels in organizations.

5 Future Work

The study will continue to its next phase, which consists on an interview with each member of the design team (whether a designer or not) in three different companies. The author will conduct the third phase during a stay of 5 days in the company, taking notes and making video documentation of the design process with focus on the social relations among the team members and their interactions.

After the identification of patterns and characteristics, and analysis of the results, a guideline to improve the communication and effectiveness of the design teams will be carried on.

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