THE EFFECTIVENESS OF WORK TEAMS

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The aim of this article is twofold. First, we summarize and integrate the main results of current research on work teams. And second, we provide a set of conclusions and suggestions for practitioners. In doing so, we focus on explanatory models of team effectiveness built on an input-process-output approach and suggest techniques for improving team effectiveness.
Key words*: work team, team cognition, team building.*

Este artículo tiene un doble objetivo. Primero, sintetizar e integrar los principales resultados de la investigación actual sobre equipos de trabajo; y segundo, ofrecer un conjunto de conclusiones y recomendaciones orientadas a la práctica profesional. Para ello, nos centramos inicialmente en los modelos explicativos de la eficacia de los equipos utilizando una aproximación (inputs, procesos, outputs), y posteriormente en los métodos para mejorar su eficacia.
Palabras clave*: equipos de trabajo, cognición del equipo, desarrollo del equipo.*

THE IMPORTANCE OF TEAMS IN ORGANIZATIONS TODAY

Organizations are currently undergoing a profound transformation. The pressure of global competition, the need to consolidate business models in dynamic, uncertain and complex settings and the need for innovation demand the modification of the structure of work traditionally based around individuals, and the adoption of organizational designs oriented to change and based on teams (West & Markiewicz, 2004). Teams meet such needs, bringing the diversity of knowledge, skills and experience that permits rapid, flexible and innovatory responses to the problems and challenges faced. Hence, the success of organizations and the global production of knowledge depend to a large extent on the effectiveness of teams (Wuchty, Jones & Uzzi, 2007).

Teams are present throughout the length and breadth of the organizational structure, constituting ideal structures for generating and sharing knowledge, enhancing performance and improving the satisfaction of their members. But teams do not always operate in this way. The challenge for research is precisely to determine how to integrate effectively and efficiently

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[1] *Analysis of the effectiveness of work teams has been the object of various reviews (see Kozlowski and Bell, 2003; Kozlowski & Ilgen, 2006; Ilgen et al., 2005; Salas, Stagl & Burke, 2004; and Gil, Alcover & Peiró, 2005, for research on Spanish and Portuguese teams). We recommend that readers wishing to explore this topic in more depth consult these works, whose principal indications and contributions have formed the basis of the present article.*

the contributions of qualified and expert workers so as to bring added value to an organization. In other words, how can we convert a team of experts into an expert team?

The aim of the present article is twofold. First, to summarize and integrate the principal results of recent research on work teams. In this regard we shall focus initially on explanatory models of the effectiveness of teams and its different variables (inputs, processes, outputs), and subsequently on methods for improving their effectiveness. And second, to offer a set of conclusions and recommendations for professional practice.

EXPLANATORY MODELS OF TEAM EFFECTIVENESS[1]

Analysis of the effectiveness of teams has generally been carried out based on the Input-Process-Output model. This model identifies the composition, structure and processes of teams as key antecedents of their effectiveness. Likewise, the model proposes that organizational and situational variables influence the structure of the team as a whole, affecting the rest of the variables (input, process, output).

Inputs represent the set of the team's resources, both internal (team composition–basically members' knowledge and skills–, team structure and task design) and external (e.g., organizational rewards, organizational culture). Such resources can be considered at different levels (resources of members, the team and the organization). Inputs can contribute to team effectiveness, but also can constitute limitations for the team´s goal achievement.

Processes are psychosocial mechanisms that allow team members to combine the available resources so as to carry out the work assigned by the organization, overcoming possible

limitations. Thus, through processes such as communication, coordination or decision-making, team members convert inputs into outputs.

Outputs are the results achieved by the team. The concept of team effectiveness is multidimensional. Generally, effectiveness is analyzed in terms of the results of work, as objectively assessed team performance (using specific indicators or expert personnel external to the team). But it also includes results that help to maintain team performance over time, such as members' satisfaction, viability (the extent to which team members want to work together in the future) and innovation.

The input-process-output model has been the target of considerable criticism focusing mainly on its static, linear and single-cycle conception. Recent years have seen the proposal of alternative models that attempt to better reflect the functioning of teams as complex adaptive systems operating in wider contexts (e.g., organizations). The CORE model (see McGrath, Arrow & Berdahl, 2000) explains the development of teams over time, identifying their basic processes (construction, operations, reconstruction and external relations) and considering relationships with the team context. In addition, the IMOI model (Input-Mediator-Output-Input; Ilgen et al., 2005) stresses the cyclical nature of feedback processes, so that the team's outputs at a given moment represent new inputs for subsequent activity. Kozlowski and Ilgen (2006) have incorporated these ideas into a model that considers teams as multilevel systems (individual, team and organizational level), oriented to processes relevant to the task and that evolve over time, so that both the processes and effectiveness of teams constitute emergent phenomena (patterns resulting from regular and repeated interaction among members).

All of these approaches show that team effectiveness in organizations is the result of complex dynamics involving multiple interrelated variables that can be assessed in different ways. Next, we review the main variables by considering the key findings from research on work teams.

INPUT VARIABLES: TEAM COMPOSITION, RESOURCES AND TASK

Team composition refers to the attributes of team members, and how they combine to form effective interdependent teams. Work teams vary in their composition, depending on type of attribute, its distribution among team members and its stability over time.

Two aspects of team composition that have been widely investigated are team size (number of individuals in the team) and members' characteristics. The central question regarding team size concerns the optimum size of the team. As team size increases, so does the quantity of resources available, but also

the demands of coordination. Research suggests that optimum size depends on certain contingencies. For example, when the interdependence required for performing a task is high and the external environment is unstable, it is advisable to create small teams.

Another important aspect is the stability/variability of team composition, the increase or reduction in number of members and the integration of new members. Modifying the composition of a work team can affect its effectiveness. However, if the changes only affect a small number of members and are made gradually, performance can be maintained or even improve (greater innovation).

The length of time that members work together as a team is also a relevant factor for both the development of the team's mental models and coordination. Thus, team members who spend most time together acquire precise common knowledge about each other job-related skills (transactive memory), and this helps them to better coordinate their actions.

Regarding members' characteristics, **homogeneity-heterogeneity** in team composition is a key variable. Research on this topic also shows how the effects of heterogeneity depend on several factors, such as the team's autonomy to carry out its activity (Rico, Molleman, Sánchez-Manzanares and Van der Vegt, 2007). Likewise, the type of diversity that is relevant depends on the task carried out by the team. Thus, diversity in knowledge and skills (vs. demographic diversity) is appropriate for teams performing creative or intellectual tasks. However, diversity can also raise obstacles to team performance, increasing the time necessary for integrating different knowledge and perspectives, and problems of identity and poor performance deriving from the formation of antagonistic subgroups within the team.

With respect to team **competencies** (the set of knowledge, skills and abilities), teamwork-related competencies are especially important. To date, research findings lead to two main conclusions: a) people can learn competencies for teamwork through the appropriate training programmes, and b) competencies for teamwork predict job performance.

Task design and team work context. Task autonomy has received most research attention in recent years. It refers to the extent to which a team has the capacity for making decisions on different aspects of its work (methods, schedules, roles, etc.). A low level of autonomy means that a team has a task that is highly structured and defined by the organization, which minimizes the need to make collective decisions or manage internal processes. In contrast, a high level of autonomy implies that team members must collectively make decisions about their work. Studies show that team task autonomy moderates the

effects of other antecedent variables (e.g., team diversity) and processes (e.g., conflict management) on team effectiveness.

Interdependence, as a team task characteristic, has also been extensively investigated. Task interdependence is the extent to which the members of a team depend on one another and interact in order to achieve the common goal. For successful execution of interdependent tasks, coordination processes, both explicit and implicit, are crucial. Also, task interdependence stimulates cohesion and confidence among team members. We refer the reader to findings on interdependence in other sections of this paper, such as team size and virtuality.

Virtuality is also becoming increasingly widely studied. Virtuality is defined on the basis of three dimensions: dependence of members on information and communications technologies for coordinating and executing team processes, types of information provided by such technologies, and synchronization of members' communications. Virtuality notably alters interactions among team members. Working regularly under conditions of high virtuality limits the use of social contextual cues present in face-to-face communication, reduces the depth of discussion and analysis of topics, and increases the time required for making collective decisions. Various studies have shown virtuality to be associated with less efficient communication, and reduced trust among team members. However, the effects of virtuality on team processes and outputs depend on task demands, so that when teams are involved in complex and/or interdependent tasks it is advisable to reduce the levels of virtuality (using richer and synchronized forms of communication, such as face-to-face meetings or videoconferences). Nevertheless, teams adapt progressively to the conditions of virtuality imposed by their work, so that as they learn to use the technology to communicate and develop new strategies for doing their tasks the effects of virtuality become weaker.

Organizational context also plays a critical role in team effectiveness (Hackman, 2002). In the input-process-output model, organizational context can be represented as three types of support for teams: 1) training, information and rewards; 2) a team structure whose composition appropriately combines the knowledge and skills required and whose norms enhance motivation and interpersonal processes; and 3) systems of coaching and leadership that provide the necessary resources and eliminate obstacles to team success. Finally, research has revealed that the complementary and strategic use of individual and team rewards enables team performance, though the common practice is still to assess and reward the individual efforts of team members.

All in all, the input-process-output model has served (and continues to serve) as a frame of reference for numerous studies, and many of the relations set out in it have received extensive empirical support.

TEAM PROCESSES AND EMERGENT STATES

Through processes, team members combine resources (skills, knowledge, effort, etc.) to perform the tasks assigned by the organization and achieve the common objectives. Processes are dynamic, and as members interact in a regular and repeated fashion, behaviour patterns and emergent states are generated, which in turn influence subsequent interactions. The list of team processes is extensive; moreover, the denominations and classifications are often difficult to distinguish. In this paper, based on prior team reviews, we use the distinction between three types of team process: cognitive, motivational/affective and action-oriented (see Kozlowski & Bell, 2003; Kozlowski & Ilgen 2006).

a) Cognitive processes. Traditionally, the cognitive processes most studied at the team level have been frames of reference, norms and role expectations. In recent years, considering teams as underlined information processors, research attention has turned to other processes and shared beliefs that help team members to anticipate situations and effectively coordinate their actions. Team mental models, transactive memory systems, team learning and team climate have been the main concepts in this respect.

Team mental models are mental structures or representations more or less shared among team members including knowledge related to different aspects of the team, the task and the organizational context (e.g., technology, members' roles). Recent studies (Rico et al., 2008) distinguish between *team mental models* (stable representations of knowledge) and *team situational models* (dynamic representations of knowledge, created and used by the team in a given situation). In general, research findings show the positive effects of shared mental models on team effectiveness. Shared mental models allow team members to anticipate teammates' actions and coordinate efficiently to complete the team's task. However, a research challenge in this field is how to accurately assess both stable and dynamic mental models.

Transactive memory consists in the expertise of the different team members, as well as in the knowledge they possess about how this expertise is distributed among them (*who knows what in the team*). This system of collective memory develops as team members learn about the experiences, preferences, interests and skills of the others. To maintain the effectiveness of transactive memory, members must interact and update their information on

their teammates' expertise. Research indicates that most effective teams are those whose members are most familiar with each other's expertise, and with the appropriate strategies for accessing, sharing and using that expertise. In addition to interaction and common experience, another factor that stimulates the formation of transactive memory is team training, through which all the members learn together how to perform a given task. Theoretical work on transactive memory is extensive; however, more empirical research is necessary to check its postulates and design better measures of this cognitive process.

Team learning is defined as the ongoing process through which team members, through the experience of working together, collectively acquire or construct new knowledge about the organization, the team itself, or the task they perform, or indeed about themselves. Different behaviours can be identified in this process, corresponding to different stages of information processing: acquisition, distribution, interpretation, storing and recovery. Research reveals that teams which learn collectively are more effective, and that certain variables, such as psychological safety and team leader coaching, enhance such learning. Nevertheless, more research is needed on the enabling conditions of team learning, especially for teams with high virtuality.

Team climate refers to the perceptions shared by team members about different dimensions of the team itself, such as objectives, participation, task-orientation and support for innovation. Research shows that the type of climate existing in a team (e.g., climate of innovation, climate of security) predicts specific members' behaviours related to it (e.g., greater number of innovations, reduction of accidents). Likewise, team climate is related to different indicators of team effectiveness, such as performance, well-being and cohesion. Team interaction and team leadership are key antecedents of team climate.

Another important cognitive process or emergent state (though it could also be considered as affective and action-oriented) is trust between team members. Trust involves the expectation that the actions of others will be motivated by good intentions, and the consequent acceptance of risks. Trust is essential for performing collective tasks based on cooperation, coordination and team learning, since this involves interpersonal risks, mutual dependence and continual adaptation to the needs and actions of others. Research shows that for developing trust between team members is necessary to interact and exchange information. Moreover, in teams with greater trust, there are more open discussions and greater exchange of knowledge, both of which improve team effectiveness.

b) **Motivational and affective processes.** These processes show how the motivations, feelings and emotions of team members combine to create a collective state that influences actions and results. Cohesion, collective efficacy, team potency, emotional processes and conflict are the key concepts in this respect.

Cohesion is the tendency or desire of team members to unite in order to achieve common goals. A recent meta-analysis of research revealed a positive relationship between cohesion and team effectiveness. Cohesion appears to be more strongly related to members' behaviour than to team results, even though its influence on results is greater for tasks requiring high levels of interdependence and coordination.

With regard to beliefs shared by members about their effectiveness as a team, a distinction is made between collective efficacy and team potency. The first refers to perceived team capacity for successfully performing a specific task, while the second refers to perceived team capacity for coping successfully with any type of task or situation. When team members share the belief that the team is effective, they are able to work hard for the team and achieve the common goal, rather than orienting themselves towards personal goals. Numerous studies have shown the positive influence of efficacy beliefs on team outputs (Gully et al., 2002).

Regarding team emotional processes, it is considered that team members collectively develop common mood states, emotions and feelings, through interaction and shared experience. These processes differ from one another in their specificity, duration and objective (e.g., emotions are brief and more specific affective states than feelings). Even though affective factors are crucial in the interpersonal context of teams, theoretical and empirical work to date is too limited to state general conclusions.

Finally, two types of team conflict have been distinguished: 1) relational conflict that emerges out of personal incompatibilities among members, being accompanied by negative affect such as anger, tension and hostility, and 2) task-related conflict that arises from discrepancies between members' points of view and opinions on their work. Traditionally, conflict has been seen as an obstacle to team effectiveness; however, recent studies suggest that this depends on the type of conflict. Whilst the majority of studies reveal the negative effects of relational conflict on team effectiveness (performance, satisfaction), the effects of task-related conflict are not so clear, being positive or negative depending on different factors, such as trust and team potency.

c) **Action-oriented processes**. Traditionally, communication, cooperation and coordination have been the processes studies in this category. Communication is a basic process within a team insofar as it permits information exchange between its members.

Thus, communication makes possible other team processes focused on both the task (decision-making) and the team (interpersonal relations). Research reveals the importance of communication for team effectiveness and shared mental models development.

Cooperation refers to voluntary contribution by team members toward the execution of the team's interdependent tasks. There is extensive literature dealing in particular with negative processes associated with cooperation and the reduction of individual effort when tasks are collective, such as *free-riding* and *social loafing*. Designing motivational and relevant tasks for team members, making individual contributions clearly identifiable (and reinforcing them) and stimulating cohesion and trust constitute effective measures for preventing lack of cooperation.

Finally, coordination refers to the strategies and behaviour patterns used by team members to combine, synchronize and temporally adjust their efforts and behaviours, with a view to achieving the common goal. Research has focused on explicit coordination, through which members plan and communicate intentionally with the aim of integrating their actions. Recent studies have stressed the importance of implicit coordination, which occurs when team members anticipate the actions and needs of their teammates and the task demands and adjust their behaviour accordingly, without the need for explicit planning or communication. Rico et al. (2008) propose an explanatory model of implicit coordination process, identifying team situational models as the key antecedent of implicit coordination behaviours (e.g., passing job-relevant information to other teammates without being asked). Moreover, the model analyzes the role of several relevant team attributes related to both its composition (team knowledge diversity) and its task context (virtuality) in the development of implicit coordination patterns and their effects on performance (see Rico et al., 2008).

Overall, research has revealed the positive effects of the behavioural processes of communication, cooperation and coordination on other team processes and outputs.

TECHNIQUES FOR IMPROVING TEAM FUNCTIONING

There are several techniques for improving the functioning and results of teams. Their effectiveness has been shown in different types of teams, such as airline crews, surgical teams and military teams. All these teams perform high-risk tasks demanding great precision, operative consistency and safety, so that errors can have serious material and human consequences.

Two types of techniques or intervention programmes can be distinguished: training programmes and team-development or *teambuilding* techniques. Among the former (see Day, Gronn & Salas, 2004), well-known examples are crossed training (team members acquire knowledge about teammates' roles and tasks), metacognitive training (aimed at making members aware of strategies they use for learning, so that they can select and use the most appropriate ones), team-coordination training (to inform members about processes for effective teamwork, and how to use them), self-correction training (members learn skills for analyzing their own performance, reviewing facts, exchanging feedback and planning future activity) and exposure to stressful situations (members learn about the main stressors that can affect team performance and effective strategies for coping with them).

Teambuilding sets out to improve global functioning of the team using various techniques, such as clarification of roles, goal-setting, problem-solving and improvement of interpersonal relations.

Numerous studies within what has been called 'team training science' are attempting to improve the training techniques mentioned above and to develop guidelines for professional practice. A recent meta-analysis (Salas, Nichols & Driskell, 2007) confirms the effectiveness of cross- training and team-coordination training. Nevertheless, findings from studies on the utility of teambuilding techniques are not totally conclusive.

CONCLUSIONS

Strategic, economic and technological changes are leading to the restructuring of organizations around teams as basic units of work, so that the effectiveness of such teams constitutes a key factor in the success of organizations. Current theoretical approaches consider teams as complex adaptive systems, whose effectiveness depends on the complex interactions of numerous input, process and output variables. A good deal of research has been carried out on these variables, and while organizational researchers have traditionally focused on context factors and results, in recent years there has been a clear increase of interest in team processes. Significant progress has been made in the study of so-called *team cognition*, but further work is necessary to identify the antecedents, effects and methods of assessment and improvement of such cognitive processes. With respect to emotional processes, theoretical development is still at an early stage, and few studies have analyzed their effects on team effectiveness. Finally, despite the recognition of the need to study team functioning across time, longitudinal studies are still the exception rather than the rule.

Research on the actual demands of today's organizations and new forms of work organization (e.g., teams with high virtuality) is lagging behind with respect to theoretical and methodological developments. Nevertheless, given the interest on topics related to work teams, a promising future for team research is expected.

SUGGESTIONS FOR PROFESSIONAL PRACTICE

The research reviewed here offers some useful suggestions for professional practice. First, it makes recommendations for education and training applicable, for example, in the context of the European Higher Education Area. Working in teams and managing teams are competencies that can be learned. Thus, it is essential to incorporate this type of training in the academic curriculum of future professionals, with the aim of responding to the needs of the current labour market and organizations.

Furthermore, based on the input-process-output model, this paper makes recommendations focused on organizational policies and practices. Organizations should provide teams with reward systems contingent upon team performance, training and technical support systems, and information systems that facilitate members' access to task-related information.

In general, organizations need to develop both team-oriented policies and practices providing appropriate support for team processes. This requires changes in the current focus on individuals in the work context. For example, although research demonstrates greater effectiveness of teams whose members work together for longer periods of time, in the planning of shifts or the composition of flight teams other criteria are often applied, such as rotation or seniority. Likewise, performance assessment and compensation systems tend to focus on members' individual contributions.

More specific recommendations can also be made. For example, when forming teams, organizations should select members not only on the basis of their task-related expertise, but also of their teamwork-related competencies (e.g., interpersonal communication, conflict management). Thus, new members would be more easily integrated into the team and would contribute more rapidly. Currently, there is a range of instruments for assessing teamwork competencies, and assessment centre techniques for using in selection processes. Also, replacement of team members is best carried out one (or few) at a time, and in general in a gradual fashion.

On designing teams, members' competencies should be combined in an appropriate manner, considering both degree of diversity and the integration required for effective execution task performance. For example, it is necessary to assess the potential of "team faultlines" (formation of subgroups within the team) due to alignment according to members' different characteristics (such as gender or educational level). It is also advisable to apply a gradual plan for developing shared mental models bringing members together in spite of any possible initial differences. To do so, ensuring a certain level of stability in team composition or cross-training team members can be applied. Such programmes are especially appropriate in organizations that use work teams made up of qualified and specialist personnel, who can take advantage of the synergy resulting from the diversity of knowledge of their different members (e.g., product development teams, top management teams).

Regarding task design, task characteristics should be appropriately aligned with the objective of team and organization, and tasks should be designed that promote task-focused effort. Moreover, tasks should be interesting and motivating for team members, who should received regular and reliable feedback on their performance.

Also, for improving cognitive processes, different processes can be applied for encouraging interpersonal and task-related communication among members, such as participation in common team experiences, giving and receiving feedback, and sessions for analyzing team processes. Furthermore, the different types of training, as reviewed above, can be applied, such as team coordination or metacognitive training.

Finally, team leaders play a crucial role in the improvement of team effectiveness, affecting both processes and outputs. The leader is fundamental in all phases of a team's activity: before the task, to plan and organize team activity; during the task, to supervise team performance; and after the task, to assess, give feedback and reward the team's performance. Moreover, the leader can establish a shared view aligned with the team objectives, create an appropriate climate of mutual support, develop team cohesion, promote training, and so on. In addition, the leader can act as the central "motor" for undertaking the transformations necessary in the team and the organization. Research has shown that the competencies necessary by leaders for achieving more effective work teams can be learned through appropriate training programmes.

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