

# ANALYSING TEAMWORK IN HIGHER EDUCATION: AN EMPIRICAL STUDY ON THE ANTECEDENTS AND CONSEQUENCES OF TEAM COHESIVENESS

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## RESUMEN

*Uno de los factores más importantes del trabajo en equipo es la cohesión entre sus miembros. Sin embargo, escasos trabajos analizan sus antecedentes y consecuencias. El presente estudio utiliza el modelo Input-Process-Output para analizar el impacto de factores individuales y de la tarea sobre la cohesión del equipo, así como la influencia de la cohesión del equipo sobre la eficacia del mismo. En base a una encuesta a 160 alumnos que realizaron trabajos en grupo, los resultados muestran que el grado de cooperación y el comportamiento colaborativo tienen una influencia positiva en la cohesión del equipo, mientras que la carga de trabajo y la complejidad de la tarea tienen una influencia negativa en la misma. Además, la cohesión del equipo influye positivamente en el aprendizaje percibido, la satisfacción con el trabajo en equipo y la calidad esperada. Finalmente, tanto el aprendizaje percibido como la calidad esperada predicen la satisfacción con el trabajo en equipo.*

## Palabras clave:

Trabajo en equipo; comportamiento colaborativo; carga de trabajo; complejidad de la tarea; cohesión; eficacia del equipo

## ABSTRACT

*One of the most important components of effective teamwork is cohesiveness. However, few empirical studies on the antecedents and consequences of group cohesiveness exist. In response to this gap, the current study draws on the Input-Process-Output model of team effectiveness to investigate the impact of individual and task factors on team cohesiveness, as well as the influence of team cohesiveness on students' perceived learning, satisfaction with teamwork, and expected quality in the outcome. Based on a survey of 160 undergraduate students who worked in groups, the findings show that cooperativeness and collaborative behaviour have a positive influence on team cohesiveness, while workload and task complexity have a negative influence on it. Additionally, team cohesiveness is positively related to perceived learning, satisfaction with teamwork, and expected quality. Finally, both perceived learning and expected quality predict satisfaction with teamwork.*

## Keywords:

Teamwork; collaborative behavior; workload; task complexity; team cohesiveness; team effectiveness

## 1. Introduction

Nowadays, many companies distribute their tasks in teams composed of workers from different areas (Curşeu et al. 2012), so teamwork has become a key factor in management (Lau et al. 2014). To prepare business students better for their future careers, teachers have integrated teamwork across the curriculum as a method for learning and for professional development (Chiriac 2008; Napier and Johnson 2007).

Due to the increasing use of teams, there is a need for research into the underlying factors that influence team effectiveness and how these factors are related to each other (Fransen et al. 2011). Prior research has shown that team-based learning has facilitated improvements in students' academic grades (Michaelsen 2013), acquisition of content knowledge (Currey et al. 2015), and development of skills (Lau et al. 2014). However, besides the positive outcomes of teamwork, there are also many problems related to working in groups (Pfaff and Huddleston 2003). Workload and task complexity are problems that are usually connected with teamwork (Kyndt et al. 2011). Previous empirical studies have argued that a perceived excessive workload is associated with a surface approach to learning (Struyven et al. 2006). In addition, tasks that are perceived to be relatively complex make individuals feel more overloaded (Gupta et al. 2013). Thus, it is important to analyse the individual's perception of how complex the task is (Braarud 2001).

Although all teams are groups of individuals, not all groups of individuals necessarily demonstrate the cohesiveness of a team (Michalski and King 1998). One of the most important components of effective teamwork is cohesiveness (Müceldili and Erdil 2015). However, few empirical studies on the antecedents and consequences of group cohesiveness exist (Müceldili and Erdil 2015). In response to this gap, the current study draws on the Input-Process-Output model of team effectiveness (McGrath 1964) to explain the impact of team cohesiveness on team effectiveness. The aim of this study is to investigate both the antecedents and consequences of team cohesiveness. First, we explore the influence of individual factors (cooperativeness and collaborative behaviour) and task factors (workload and task complexity) on team cohesiveness. Finally, we investigate the impact of team cohesiveness on team effectiveness, measured as perceived learning, satisfaction with teamwork, and expected quality. This study contributes to the literature by empirically analysing the determinants and outcomes of team cohesiveness. The results obtained may help teachers in designing teamwork activities.

The paper is structured as follows. Section 2 contains a brief discussion of the Input-Process-Output framework, a description of the conceptual framework, and the development of the research hypotheses. Section 3 is devoted to the methodology and Section 4 to the empirical findings. In Section 5, the conclusions, the implications for teaching practice and future line of research are presented.

## 2. Theoretical framework and research hypotheses

### 2.1. *The Input-Process-Output framework*

Team effectiveness has been the core focus of theory and research on teams (Kozlowski and Bell 2001). The organizational literature has provided several models of team effectiveness (e.g. McGrath 1964; Hackman 1983, 1987; Salas et al. 1992; Tannenbaum et al. 1992; Cannon-Bowers et al. 1995; Klimoski and Jones 1995), most of which have been formulated around the Input-Process-Output (I-P-O) framework posited by McGrath (1964).

According to the I-P-O framework, input factors affect group interaction processes, which in turn affect the output of the group (Hackman 1983). *Inputs* are variables that can affect teamwork at various levels (e.g., individual, group and environment) both internally (e.g., members' skills, attitudes, personality, group structure, group size) and externally (e.g., level of environmental stress, reward structure). Inputs set the conditions under which group interaction processes take place (McGrath 1984). *Group interaction processes* take place when team

members interact (McGrath 1984) and indicate how a group is performing (Hackman 1983). Finally, *outcomes* are criteria to assess the effectiveness of team actions. Teamwork effectiveness can be assessed in terms of performance outcomes (e.g., performance quality, speed to solution and number of errors) or attitudes, beliefs, and behaviours (e.g., member satisfaction and attitude change) (McGrath 1964).

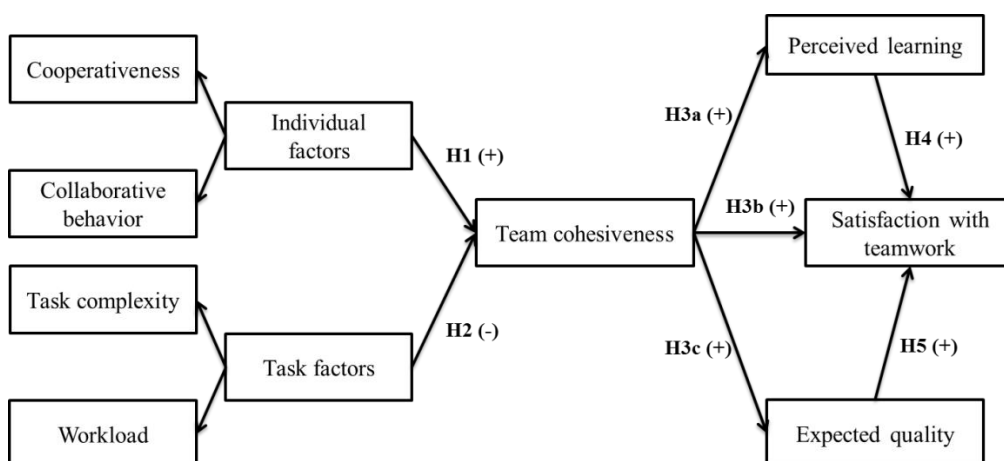
As mentioned above, the impact of team cohesiveness on teamwork can be explained through the I-P-O framework. However, it is not clear where to place this variable within the original framework. On the one hand, team cohesiveness can be considered as an input that refers to the group-level factors. In this sense, team cohesiveness may influence team processes and, eventually, the outcome of teamwork. On the other hand, Hackman (1983) refers to team cohesiveness as an outcome. From this perspective, team cohesiveness is the result of all the teamwork processes. Furthermore, team cohesiveness is determined by individual and task factors, and it affects outcome variables related to team effectiveness such as perceived learning, satisfaction and expected quality. Consequently, team cohesiveness is a central element that connects inputs and outputs in teamwork. This latter perspective is considered in this paper and is explained in the following section.

## 2.2. Research hypotheses

Based on the I-P-O framework, which is proposed to understand the effectiveness of learning processes in working teams, the present study proposes a set of four input factors that are grouped into individual factors (cooperativeness and collaborative behaviour) and task factors (task complexity and workload). These inputs have an impact on team cohesiveness, which represents the process factor. Finally, team cohesiveness relates to three output factors, namely perceived learning, satisfaction with teamwork, and expected quality. The proposed model underlying this research is shown in Figure 1.

FIGURE 1

### Proposed model



### 2.2.1. Individual and task factors

In the pioneering work of Festinger (1950), group cohesion is considered as the “*resultant of all the forces acting on the members to remain in the group*” (p. 274). This perspective matches with the view of cohesiveness as an output factor (Hackman 1983) and implies a number of emotions that make people feel attached to each other (Cohen and Bailey 1997; Williams et al. 2006). The forces mentioned above involve interpersonal attraction, commitment to task, and group pride (Mullen and Copper 1994; Carless and de Paola 2000), which imply that, behind the feeling of attachment to a group, there are both individual and task factors.

Teams are more likely to be effective if their members show commitment toward both the team and the task (Hirowaka et al. 2003). Academics have used different variables to refer to the commitment of individuals to their teams, including teamwork orientation (Williams et al. 2003), propensity to trust (Chen et al. 2008) and cooperativeness (Pfaff and Huddleston 2003). In this study, we use cooperativeness and collaborative behaviour because they are the basis of the cooperative and collaborative learning styles (e.g. Pfaff and Huddleston 2003; Williams et al. 2006; Fransen et al. 2011).

The tendency of individuals to cooperate is one of the main determinants of team cohesiveness. In a professional setting, Al-Rawi (2008) found that teamwork cohesiveness is more related to participation propensity and cooperative behaviours than other personality traits such as intelligence or leadership skills. Team members should cooperate rather than compete among themselves in order to develop synergies (Sweeney and Lee 1999). The predisposition to work in teams has been directly related to the attitude toward teamwork (Pfaff and Huddleston 2003), team trust (Chen et al. 2008), and group cohesiveness (Williams et al. 2006). We thus propose the first hypothesis of the model:

**H1:** Individual factors (cooperativeness and collaborative behaviour) have a positive influence on team cohesiveness.

Besides individual factors, task characteristics might be a strong determinant of team cohesiveness (Hirowaka et al. 2003) and can have an influence on group behaviour. Task design is not a minor issue since it may affect the degree to which the members of a team decide to perform their job more or less interdependently (Sargent and Sue-Chan 2001). Depending on task complexity and workload, people exhibit different levels of commitment. A task increases in complexity when the number of elements and their degree of interactivity grow (Sweller 1994). In higher education studies, team assignments usually have a significant workload. Besides, students have to deal with different assignments from different subjects at the same time. This situation can result in a feeling of overwork.

Workload is a clear determinant of attitudes toward teamwork: the higher the amount of work, the worse the whole experience will be (Feichtner and Davis 1984; Pfaff and Huddleston 2003). Kyndt et al. (2011) prove that greater complexity and a large workload result in students perceiving a lack of information to implement the task. If students can work on their assignments in class time, they have the possibility to interact with the instructors and reduce their perceptions about the complexity of the task and the workload. In consequence, their attitudes toward the teamwork will be more positive (Pfaff and Huddleston 2003). Thus, we propose the following hypothesis:

**H2:** Task factors (task complexity and workload) have a negative influence on team cohesiveness.

### *2.2.2. Team cohesiveness and team effectiveness*

The last stage in the proposed model deals with the relationship between team cohesiveness and team effectiveness. Team effectiveness can be analysed in many different ways. It is difficult to develop a common specification of team effectiveness across different studies as it varies depending on the type of team (Kozlowski and Bell 2001). Most research on teams has measured team effectiveness as achievement or performance based on grades. However, as some researchers have argued, the use of grades as a measure of learning can be problematic. Grades do not always reflect “pure” learning but also incorporate other considerations, such as classroom participation and attendance (Caspi and Blau 2008). Alternatively, an increasing number of researchers are suggesting that learning outcomes can be better assessed through students’ perceptions of learning outcomes. Thus, in this study, teamwork effectiveness is measured in terms of perceived learning, satisfaction with teamwork, and expected quality. Perceived learning is a retrospective evaluation of the learning experience and can be defined in terms of the feelings one has about the learning that has occurred (Caspi and Blau 2008).

Satisfaction with teamwork is also an important outcome in the literature (Napier and Johnson 2007). Finally, it is interesting to analyze the expected quality of the teamwork (Lau et al. 2014).

Team cohesiveness is important for understanding the performance of groups (Huang 2009). Most empirical research has found a positive relationship between team cohesiveness and performance (Dailey 1978; Evans and Dion 1991; Mullen and Cooper 1994). Teams can achieve better performance by strengthening their cohesion (Levin and Moreland 1990). In academic settings, group cohesiveness is positively associated with students' learning (Williams et al. 2006). Previous studies have also empirically explored the relationship between perceived learning and satisfaction, demonstrating that students who perceive higher levels of learning tend to be more satisfied with their courses (So and Brush 2008).

Based on the arguments above, we expect to see improvements in perceived learning, satisfaction, and expected quality in highly cohesive teams. In other words, we propose that team cohesiveness will have a positive effect on students' perceived learning, satisfaction with teamwork, and expected quality. We also expect that students' perception of learning and expected quality will have a positive effect on students' level of satisfaction with teamwork. Therefore, we propose the following hypotheses:

**H3:** Team cohesiveness has a positive influence on (a) perceived learning, (b) satisfaction with teamwork, and (c) expected quality.

**H4:** Perceived learning has a positive influence on satisfaction with teamwork.

**H5:** Expected quality has a positive influence on satisfaction with teamwork.

### 3. Methodology

The empirical study was carried out in a Spanish faculty of business and economics. Students enrolled in different degrees, years and subjects took part in the study, which favours heterogeneity in the responses. All of them were working in teams at the time the study took place.

A self-administered questionnaire was given to 165 students. After rejecting invalid responses, we obtained a final sample of 160 students. Participation in the study was voluntary and students were assured that non-participation would not affect their grades in any way. Anonymity and confidentiality of data was guaranteed for those who participated.

Scales based on previous literature were employed to measure the constructs included in the model, as can be seen in Table 1. In all cases, seven-point Likert scale items were used. Cooperativeness was measured using items from Pfaff and Huddleston (2003). Measures of collaborative behaviour were adapted from the work of Gargallo et al. (2009). Task complexity and workload were measured using items from Kyndt et al. (2010). Team cohesiveness was based on the work of Sargent and Sue-Chan (2001), Pfaff and Huddleston (2003), and Fransen et al. (2011). Measures of perceived learning were adapted from Alavi (1994). Expected quality was measured using items from Lau et al. (2014). Finally, satisfaction with teamwork was assessed following Wageman et al. (2005) and Fransen et al. (2011). In order to control for common method bias, two extra items that were unrelated to the variables were also included in the questionnaire. These items were the degree of the respondents' preference for sports and cultural activities.

TABLE 1  
Scales composition

<b>Cooperativeness</b> (Pfaff and Huddleston 2003)
I like to work with other people Cooperation is preferable to competition I consider myself to be a competitive person (r) Work assignments are better when I do them by myself than when I do them with others (r)
<b>Collaborative behaviour</b> (Gargallo et al. 2009)
I like to study and to work with my classmates If I don't understand something, I ask my classmates for help I usually choose suitable classmates to work with I get on well with my classmates Teamwork is stimulating for me
<b>Task complexity</b> (Kyndt et al. 2010)
I have undertaken similar tasks in other subjects I have too little information while completing this task I find it difficult to get the suitable information for the teamwork
<b>Workload</b> (Kyndt et al. 2010)
Teamwork requires a lot of my time I find teamwork hard I experience a lot of time pressure while working in teams I feel insecure, discouraged, stressed,... working in teams
<b>Team cohesiveness</b> (Sargent and Sue-Chan 2001; Pfaff and Huddleston 2003; Fransen et al. 2011)
I am friends with the members of my team I feel a sense of belonging to my team I get along with members of my team In my team, nobody benefits from the work of the others Every member in the team fulfils their part In my team, every task is carried out the way we agreed
<b>Perceived learning</b> (Alavi 1994)
I am gaining a good understanding of the basic concepts of this subject I am developing an ability to communicate clearly about the subject I am learning to interrelate the important issues in the course I am learning a great deal about concepts in this course I am learning to identify the central issues of the subject I am improving my ability to integrate facts and develop generalizations from the course materials
<b>Expected quality</b> (Lau et al. 2014)
The results of the work of my team is of high quality I think the work of my team deserves a high mark I think the marks from this teamwork will be high
<b>Satisfaction with teamwork</b> (Wageman et al. 2005; Fransen et al. 2011)
In general, I am satisfied with the work of my team I enjoy working with my team Working in this team is an exercise in frustration (r) I want to work with this team in the future

#### 4. Analysis and results

To test the hypotheses, partial least squares (PLS) structural equation modelling with the software SmartPLS 3 was used (Ringle, Wende, and Becker 2015). First, the reliability and validity of the constructs were assessed. All standardized factor loadings were above 0.7 (Carmines and Zeller 1979), which suggests that individual item reliability was adequate. In addition, all the constructs were internally consistent because their composite reliabilities (CR) were greater than 0.7 (Nunnally and Bernstein 1994), with the exception of Cooperativeness, which was slightly below the threshold. In addition, the constructs met the convergent validity criteria because the average variance extracted (AVE) values were above 0.5 (Fornell and

Larcker 1981). Finally, discriminant validity was also supported. In all cases, the root of the AVE was greater than the correlation estimate for any two constructs (Fornell and Larcker 1981). Measurement model results are shown in Table 2.

TABLE 2  
Convergent validity and reliability of the scales

	Cronbach's Alpha (>0.7)	Composite Reliability Index (>0.7)	AVE (Average Variance Extracted) (>0.5)
Team cohesiveness	0.918	0.936	0.708
Collaborative behaviour	0.707	0.837	0.624
Task complexity	0.831	0.922	0.853
Cooperativeness	0.637	0.804	0.575
Expected quality	0.799	0.881	0.715
Perceived learning	0.909	0.929	0.686
Satisfaction	0.862	0.906	0.708
Workload	0.810	0.876	0.617

Given that there is a conceptual relationship between the constructs of team cohesiveness and collaborative behaviour, we developed a second order factor that grouped these two factors and the resultant construct was called "individual factors". Following the same procedure, we built a second order factor called "task factors" that grouped the concepts of workload and task complexity.

Within the proposed model, we controlled for the effects of two different variables, the gender and the country of origin of the respondent, developing a Shannon entropy index following the work of Orlitzky and Benjamin (2003). This index was calculated by applying the formula  $\sum -Pi(\ln Pi)$ , where Pi represented the proportions of male and female gender and the proportions of national and foreign students in the sample.

The proposed model was then tested. To assess the significance of the path coefficients, a bootstrapping procedure with 5,000 subsamples was used. The results revealed that all factorial loadings were significant at 1%. The individual and task factors accounted for 21.0% of the variance of team cohesiveness. In turn, team cohesiveness accounted for 8.7% of perceived learning, 18.3% of expected quality, and 75.8% of satisfaction with teamwork. The Stone-Geisser test criterion ( $Q^2$ ) exceeded the threshold of 0 for all the dependent variables, thereby supporting the predictive relevance of the model. Table 3 presents the results of the structural model.

TABLE 3  
Results of the structural model

	$\beta$	t-value
Individual factors - cohesiveness	0.336	4.471***
Task factors - cohesiveness	-0.253	3.095***
Cohesiveness – perceived learning	0.177	2.094**
Cohesiveness – satisfaction	0.663	14.811***
Cohesiveness – expected quality	0.409	4.860***
Perceived learning - satisfaction	0.155	3.619***
Expected quality - satisfaction	0.312	6.664***
R <sup>2</sup> cohesiveness: 0.210; R <sup>2</sup> expected quality: 0.183; R <sup>2</sup> perceived learning: 0.087; R <sup>2</sup> satisfaction: 0.785		

\*p<0,1; \*\*p≤0,05; \*\*\*p≤0,01

The results indicate that team cohesiveness is explained by individual ( $\beta=0.336$ ;  $p<0.05$ ) and task ( $\beta=-0.253$ ;  $p<0.05$ ) factors. This means that cooperativeness and collaborative behaviour have a positive effect on team cohesiveness whereas workload and task complexity have a negative effect on it, supporting H1 and H2, respectively. Regarding the effect of team cohesiveness on team effectiveness, the results show that team cohesiveness has positive and

significant effects on perceived learning ( $\beta=0.177$ ;  $p<0.05$ ), satisfaction with teamwork ( $\beta=0.663$ ;  $p<0.05$ ) and expected quality ( $\beta=0.409$ ;  $p<0.05$ ), supporting H3a, H3b, and H3c, respectively. Finally, as proposed in H4 and H5, satisfaction with teamwork is also explained by perceived learning ( $\beta=0.155$ ;  $p<0.05$ ) and expected quality ( $\beta=0.312$ ;  $p<0.05$ ).

## 5. Conclusion, implications and limitations

Team cohesiveness is an important requirement for the functioning of teams in organizations and influences the attitudes of team members toward the organization as a whole (Al-Rawi 2008). Teaching students how to work in teams is a concern in higher education, especially in business studies. However, despite the importance of team cohesiveness for teamwork, there are few empirical studies on the antecedents and consequences of team cohesiveness (Müceldili and Erdil 2015). In addition, there is no consensus in the literature about the effects of different variables, such as cooperativeness and workload, on teamwork. To address these shortages, the current study draws on the Input-Process-Output model of team effectiveness (McGrath 1964) to analyse empirically the determinants and outcomes of team cohesiveness.

In the light of the results obtained, we can conclude that team cohesiveness plays a key role in the process of teamwork. Overall, the findings of this study indicate that individual factors (cooperativeness and collaborative behaviour) have a positive influence on team cohesiveness whereas task factors (workload and task complexity) have a negative influence on it. The results also show that team cohesiveness has a positive impact on team effectiveness, measured as perceived learning, satisfaction with teamwork, and expected quality. It is interesting to note that the strongest effect of team cohesiveness is on satisfaction. Finally, both perceived learning and expected quality also predict satisfaction with teamwork.

The results of this study have implications for teaching practice. The ability to work in a team is a competence that is increasingly gaining importance in the labour market. Collaborative learning may increase individual achievement even more than individual or competitive learning (Jonson et al. 1998). Hence, it is important for instructors to promote this kind of activities in their teaching and encourage their students to work in teams. Given that the focus of this paper is on team cohesiveness, the main recommendation for teachers is to try to enhance team cohesiveness by emphasizing the importance of cooperativeness and collaborative behaviours in students' future careers. This may be also a way to reduce the common problem of "free riding" or "social loafing". This refers to people reducing their individual effort when they are working with other people (Latané et al. 1979). Furthermore, the complexity and the workload are important aspects for teachers when designing teamwork activities. If students perceive that the workload and task complexity are excessive, the effect on team cohesiveness and on the expected quality of their work may be negative. By carefully planning these activities, teachers can partially avoid these negative results.

Some limitations of this study, which also suggest directions for further research, should be noted. First, even though the respondents in our study were selected from different degrees, years and subjects, the results of this work should be interpreted in the context of study. It would be interesting to broaden the scope of the analysis to other faculties, universities, and students outside the university in order to gain generalizability. Another avenue for future research is to gather responses from students both before and after teamwork activities. A cross-sectional research design of the survey would enable us to analyse the differences in students' opinions in the two stages. Finally, since team cohesiveness is a dynamic process, longitudinal research could be used to understand the impact of individual and task factors on team cohesiveness and on team performance over time.



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