EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE

Sibel Özgen

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DOCTORAL THESIS

SIBEL ÖZGEN

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DOCTORAL THESIS

Sibel Özgen

Supervised by: Dr. Joan Ramon Alabart and Dr Magda Medir

Department
of Chemical and Process Engineering

UNIVERSITAT ROVIRA I VIRGILI

Tarragona
2010

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I, Joan Ramon Alabart Córdoba, professor in the Department d'Enginyeria Química, Universitat Rovira I Virgili,

CERTIFY:

That the present study, entitled "Exploratory Search for Relevant Features of the Impact of Leadership on Team Performance" presented by Sibel Özgen for the award of the degree of Doctor, has been carried out under my supervision at the department of Chemical Engineering of this university.

Tarragona, 26 April 2010

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I, Magda Medir Mercé, professor in the Department d'Enginyeria Química, Universitat Rovira I Virgili,

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To my family,

Nurettin and Güler Özgen,

Gökhan Özgen, Betül Gürbüz, and

Guillaume Novelli

who showed me the way

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No man is an island.

John Donne

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Exploratory Search for the Relevant Features of the Impact of Leadership on Team Performance

Abstract

The educational model implemented at the Escola Tècnica Superior d'Enginyeria Química (ETSEQ) of the Universitat Rovira i Virgili (URV) is intended to facilitate the acquisition of technical and scientific knowledge and simultaneously the development of relevant social competences by chemical engineering students. The main teaching and learning approach used is called the Integrated Design Project (IDP), which is a combination of the project-based and cooperative learning methodologies. The IDP has been deployed to the first four academic years of the program, involving all the courses. The deployment of the IDP to the first year courses requires the vertical integration of a fourth-year course, Project Management in Practice (PMP), which provides about a dozen students take on the leadership role of the first-year teams as leadership has been identified as a key component for the success of any team endeavor.

This research explores the link between team leadership and team performance. Firstly, it is argued here that leadership performance is positively related to team performance. Secondly, it is hypothesized that leaders' personality profiles have an impact on their leadership performance. Thirdly, it is postulated that team role balance is also associated with team performance.

The data was collected from the 4th-year Ch.E. students who took on the leadership role of the 1st-year IDP teams and from their respective team members. The study used a mixed method approach. Quantitative methods are used to test the study hypotheses and qualitative methods (case studies) are used to provide an in-depth analysis of the leadership behaviors shown by the leader students and their impact on the team.

Results show that the leadership performance of 4th-year student leaders is significantly related to the performance of the IDP teams that they lead; that is to say, the better the leadership performance the better the team performance. Results also demonstrate that the leader students' personality profile may impact on their leadership performance. The results showed no association between team role balance and the performance of the IDP teams.

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Table of Content

------ Volume 1------

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

List of Tables

Chapter 3 Results and Discussion

Chapter 4 Case Studies

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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List of Figures

Chapter 4 Case Studies

UNIVERSITAT ROVIRA I VIRGILI
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CHAPTER 1

INTRODUCTION

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1. INTRODUCTION

This study aims to explore the relevant features of the impact of leadership on team performance.

1.1. LEADERSHIP AND TEAM PERFORMANCE

Leadership has been of interest to society for thousands of years (Rowden, 2000) and some form of leadership has been indicated to exist in all known human societies (Boehm, 1999 as cited in Van Vugt, 2006). The issue of how to master leadership has occupied all philosophers, great thinkers, tribes, and societies (Clavell, 1983).

However, the popularity of leadership has immensely increased in the past decade with 27,248 books[1] and more than 7500 articles (Bass, 1990) being published about the topic. The recent global crisis has only amplified the importance of leadership and how it impacts personal, societal and business life[2].

Despite its growing popularity and the proliferation of the literature on the subject, there is little agreement on the definition of leadership. The

[1] www.amazon.com, consulted on April 2010.
[2] Financial Times January 6, 2010 and July 7, 2008.

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leadership scholar, Ralph Stogdill, after an exhaustive review of the definitions proposed by the scholars, made the following statement (Sogdill, 1974):

> "*there are almost as many as definitions of the leadership as there are persons who have attempted to define the concept*".

If one traces back the origin of the word "leadership" one will find the Indo-Germanic root "To lead": the verb goes back to a prehistoric West and North Germanic *laihjan*. This was derived from *laitho* 'way, journey'; so etymologically lead means 'cause to go along one's way' (Ayto, 1990).

But apart from origin of the word, no otherwise single agreed upon definition exists. Appendix 1.1 presents a summary of the definitions available in the literature.

It can be seen that the most common denominator in those definitions is the **people**; the group of individuals, the followers. As the cliché goes, "without followers, there can be no leaders"!

In this respect, Kets de Vries's definition of effective leaders is interesting. He says (Kets de Vries, 1995):

> "*Leaders need to envision the future and empower, energize, and motivate their followers. But the leaders also have to structure, design, control, and reward behavior*".

By **envision**, he means determining effectively the direction to be followed and building the commitment to go in that direction. By **empower**, he means taking the best out of the people by expressing high performance expectations and by the enhancement of self-esteem and self-confidence in people. By **energizing**, he means channeling enormous amount of free-floating aggressive and affectionate energy in the right direction (Kets de Vries, 1995; p. 8-12).

Having examined briefly the definitions of leadership, we may now turn to look at the reason why a plethora of cutting edge leadership materials (e.g. research articles, books, movies, and case studies) has evolved during the last decades.

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Popularity of Leadership

Leadership has been claimed to be the subject that attracted most attention in the business world (D'Alessio, 2006). Perhaps, the most prominent reason for this growing interest in leadership is due to the widespread belief that leadership can affect the performance of organizations (Rowe *et al.*, 2005). Also, in period of crisis like today, leadership is considered one of the remedies as it will help to provide a new order of things (Kotter, 1990).

For example, Bennis and Nanus (1985) argue that the organizational success is inextricably linked to leadership and Hogan *et al.* (1994) claim that leadership really matters. There is a large volume of studies that indicate a link between leadership and organizational effectiveness (e.g. Howell and Avolio, 1993; Yukl, 1998; Judge *et al.*, 2002).

Research also has shown that several patterns of leadership behavior are associated with employee empowerment, job satisfaction, organizational commitment, creativity and intention to leave (Ugboro and Obeng, 2000; Loke, 2001; Shin and Zhou, 2003; Berson and Linton, 2005).

In addition to the organizations, leadership is also considered key for the success of teams.

Impact of Leadership on Team Performance

A large and growing body of research considers leadership as one of the key determinants of team effectiveness and team success (Morris and Mountfort, 1997; Zaccaro et al., 2001; Weinkauf and Hoegl, 2002) due to the important role the leader plays in target setting, steering the group dynamics in the right direction (Singh and Muncherji, 2007), resolving conflicts and keeping the team on track (Bradley and Hebert, 1997) and facilitating team process (Steckler and Fondas, 1995). In this regard, Parker (1990) argues that leadership should be considered as the **most important factor** affecting team effectiveness.

ISBN:978-84-693-5423-0/DL:T-1414-2010

The Other Side of Leadership

A considerable amount of literature has portrayed leadership as something glorious which produces positive outcomes. Unfortunately, there is the other side of the leadership; the absence of leadership[3], or better: not acting as a leader when the situation calls for it.

It has been claimed that this other form of leadership in the workplace can darken the lives of many (Kets de Vries, 2006; p.6). Throughout the history of man the absence of leadership has caused empires to disappear; "The ultimate cause of imperial collapse is suicidal statecraft" (Toynbee, 1934-1961).

Ineffective leadership may devastate an organization by leading to high turnover rates and low productivity and may adversely affect employees by causing lack of interest, low self-confidence, distrust, demoralization, and low job performance (Toor and Ogunlana, 2009).

In fact, a study reported that the worst and most stressful aspect of the employees' job was their immediate supervisor (Hogan *et al.*, 1990 as cited in Hogan *et al.*, 1994). Some dysfunctional leadership behaviors and behavior lead to leadership derailment are presented in Appendix 1.2.

Other Factors Impacting Team Performance

As the popularity of teams in organizations soared (Jordan *et al.*, 2002), more emphasis has been given to identify and examine the factors influencing team performance (Pirola-Merlo *et al.*, 2002). As a matter of fact, leadership has not been the only factor studied in literature to investigate team performance.

Up to now, many factors have been investigated in literature. In this regard, Guzzo and Dickson (1996) provide a review on the factors (e.g. group composition, cohesiveness, etc.) that have impact upon the effectiveness of teams at work in organizations. Table 1.1 presents other factors examined in literature (although not exhaustive).

[3] It might also be termed as *shadow side* of leadership *toxic* leadership, *abusive* leadership, or *destructive* leadership.

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Table 1.1: Factors impacting on team performance

Dimension	Reference
Team knowledge	Cooke *et al.*, 2000
Team size	Deeter-Schmelz *et al.*, 2002
Team demography and diversity	Jackson *et al.* 1991; Ancona and Caldwell, 1992; Jehn *et al.* 1999; Kirkman *et al.* 2004
Team-set goal difficulty and team tactics	Durham *et al.*, 1997
Group composition , cohesiveness	Bradley and Hebert, 1997
Team mates' shared mental models	Härtel *et al.*, 1998; Mathieu *et al.* 2000
Members' cognitive ability and collective behavior	Devine and Philips, 2001;Driskell and Salas, 1992
Group process variables	Jordan *et al.*, 2002
Big Five personality factors	Kichuk and Wiesner, 1997; Mohammed and Angell, 2003
Conflict types	Jehn *et al.*, 1999; De Dreu and Weingart, 2003; Jehn *et al.*, 2008
Trust	Dirks, 2000; Costa, 2003; Erdem *et al.*, 2003
Emotional intelligence	Aslan *et al.*, 2008; Jordan and Troth, 2004; Luca and Tarricone, 2001
Team climate	Anderson and West, 1998; Bain *et al.*, 2001; Pirola-Merlo *et al.*, 2002; Loo, 2003; Loewen and Loo, 2004; Acuña *et al.*, 2008
Members' **Belbin team roles**	Belbin, 1981-1993; Senior, 1997; Partington and Harris, 1999; Prichard and Stanton, 1999; Higgs *et al.*, 2005; Blenkinsop and Maddison 2007; Van de Water *et al.*, 2007-2008

Of these factors listed in Table 1.1, Belbin's team role theory received much attention in the literature with his powerful claim that "balanced teams" (i.e. those have a diversity of team roles) have a higher propensity to perform better than "unbalanced" teams.

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1.2. LEADERSHIP DEVELOPMENT EFFORTS IN ENGINEERING

Leadership development programs have become an increasing priority (Cacioppe, 1998) and investment in leadership education and development approached $50 billion in 2000 (Fulmer and Goldsmith, 2000).

Likewise, leadership and its development has become an increasing concern for engineering educators. The National Academy of Engineering in its *Engineer of 2020* report concludes:

> "By 2020 we aspire to engineers who will **assume leadership positions** from which they can serve as positive influences in the making of public policy and in the administration of government and industry".
>
> "Our inspiration is to shape the engineering curriculum for 2020 so as to be responsive to the disparate learning styles of different student populations and attractive for all those seeking a full and well-rounded education that prepares a person for a creative and productive life and **positions of leadership**".
>
> "In the past those engineers who mastered the principles of business and management were rewarded with **leadership roles**. This will be no different in the future. However, with the growing interdependence between technology and the economic and social foundations of modern society, **there will be an increasing number of opportunities for engineers to exercise their potential as leaders,** not only in business but also in the non-profit and government sectors".

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An overview of the leadership development initiatives implemented in engineering schools is investigated in two sections:

1) Leadership development efforts in other engineering schools
2) Leadership development at Escola Tècnica Química Superior d'Enginyeria Química (ETSEQ) at Universitat Rovira i Virgili (URV).

1.2.1. LEADERSHIP DEVELOPMENT EFFORTS IN OTHER ENGINEERING SCHOOLS

This section provides an overview of the initiatives taken in other engineering schools/departments to develop engineering students' leadership competence.

For this purpose, an online search has been completed using the following keywords: "engineering, leadership, leadership development, engineering leadership, leadership engineering". The results of this search are displayed in Table 1.2. This table is not exhaustive yet presents an overview of the worldwide practices in development of engineering students' leadership.

The first three programs presented in Table 1.2 have been in operation for a longer time in comparison to the others. The *McBride Honors Program* at Colorado School of Mines was established in 1978, the *Robe Leadership Institute* at Ohio University in 1996 and the *Institute for Leadership in Technology and Management* at Buknell University in 1993. Majority of the other programs are newly established; between 2002 and 2009.

The following four programs in Table 1.2 (from 4th to 7th) provide **minors** in engineering leadership development: Penn State University, University of Maryland, University of Maine, and Lehigh University. The 8th and 9th program presented in Table 1.2 provide **certificates** for leadership studies: Purdue University and the University of Texas at Austin.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 1.2: Engineering leadership development efforts in other universities

	Name of the Program Course	University	Country
1	The McBride Honors Program *	Colorado School of Mines	USA
2	Robe Leadership Institute in the Russ College of Engineering *	Ohio University	USA
3	Institute for Leadership in Technology and Management *	Bucknell University	USA
4	Engineering Leadership Development Minor *	Penn State University	USA
5	The Minor in Engineering Leadership Development, A. James Clark School of Engineering	University of Maryland	USA
6	Engineering Leadership and Management Minor,College of Engineering *	University of Maine	USA
7	Minor in Engineering Leadership	Lehigh University	USA
8	Leadership Studies Certificate, School of Engineering and Technology	Purdue University	USA
9	Engineering Leadership Institute Certificate Program	The University of Texas at Austin	USA
10	Engineering Leadership Program, College of Engineering *	Iowa State University	USA
11	Innovation Leaders Honors Program *	Florida Atlantic University	USA
12	Self Engineering Leadership Fellows Program *	University of Kansas	USA
13	Gordon Engineering Leadership Program	Northeastern University	USA
14	Gordon-MIT Engineering Leadership Program *	MIT	USA
15	Tufts Engineering Leadership Program	Tufts University	USA
16	Leaders of Tomorrow, Engineering Leadership Development Program	University of Toronto	Canada
17	Engineering Leadership Program *	Monash University	Australia

* Has a set of admission criteria

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Some of these programs have a set of **admission criteria** (as shown by asterisks in Table 1.2) and they generally look for:

Academic excellence

Past leadership experience and evidence of leadership skills

Interview performance

Quality in written essays

Recommendations and references from faculty members/advisors, etc.

It is interesting to note that the big majority of the leadership development programs for engineers are based in USA. This finding is clearly stated in the review of Dr. Ruth Graham (2009) who conducted a series of interviews with experts in engineering education and engineering leadership education. The findings from this interview process revealed (Graham, Crawley, Mendelsohn, 2009):

> "that engineering leadership education, as a sub-discipline, **is not** currently on the radar of the most engineering education experts **outside the US**."

> "a level of discomfort with the *leadership education* by many of the **non-US interviewees**, as they felt that this concept ran counter to their educational **culture of inclusiveness and equality**."

> "the US interviewees were generally comfortable with the concept of educating undergraduates in leadership, …but were typically only familiar with the engineering education scene in the US. The **non-US interviewees** tended to be much more familiar with the international scene in engineering education, but **were less engaged with leadership** as a specific discipline…"

The structures of some of those programs, their learning objectives, the details of their courses are well documented in the report of Dr. Graham and elsewhere (Marra, 1996; Burton *et al.*, 1996; Rover *et al.*, 2006; Olds and Miller, 1996; McCloskey and Reel, 1996; Gruver and Satamos, 1997; Odom *et al.*, 1999;

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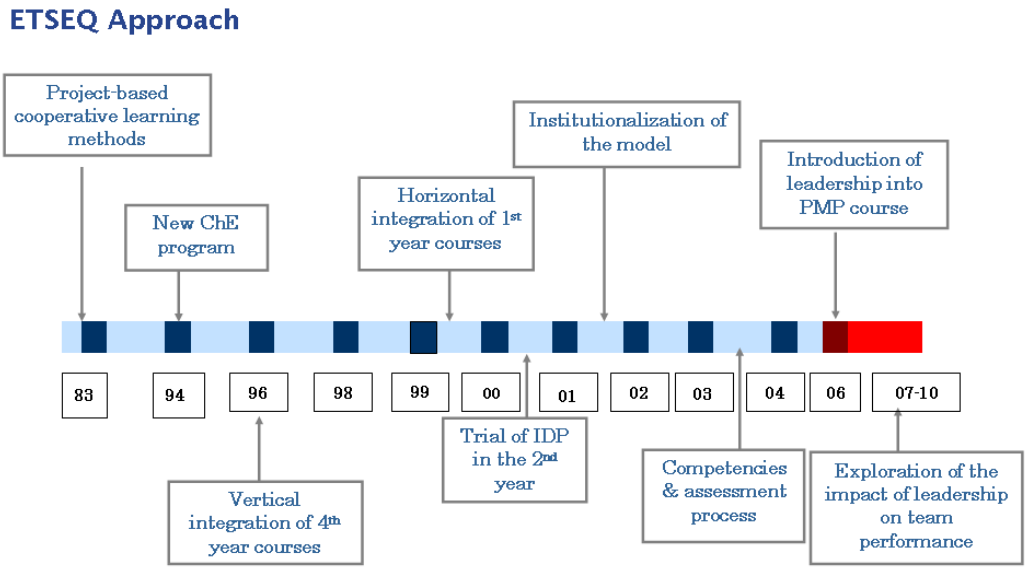
Okudan and Rzasa, 2004; Athreya *et al.*, 2007; Athreya *et al.*, 2008; Kalkhoff *et al.*, 2009; Stevens *et al.*, 2009; Holloway, 2009; Bayless *et al.*, 2009).

1.2.2. LEADERSHIP DEVELOPMENT AT ETSEQ

ETSEQ has a long-standing experience with student-centered instructional approaches (Giralt *et al.*, 1994a, b; Giralt *et al.*, 1999). The first efforts date back to the 80's with the initiative taken to introduce the project-based and cooperative learning methods into the Industrial Chemistry curriculum (see Figure 1.1).



Adapted from Witt, 2005

Figure 1.1: Landmarks of integrated design projects at the ETSEQ

ETSEQ implemented the new five-year undergraduate chemical engineering program in 1994 with emphasis on both acquisition of knowledge and development of social and management competences needed in real-life work settings (Giralt *et al.*, 2000). In 1995, the integrated design project (IDP) was implemented in the first year of Ch.E program.

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The challenge then was how to provide strong leadership to these first-year project teams. The allocation of several professors to tutor each team was not practical given the constraints of limited faculty and budget. Then, it was thought that senior students might take on that role.

The idea of project teams formed by first-year students led by a more experienced student was put in practice, see Figure 1.2. In this IDP setting, the fourth-year students were provided with the Project Management in Practice course (PMP) to enable them to stimulate the practice of a project manager; whereby bringing about the vertical integration to the IDP approach.

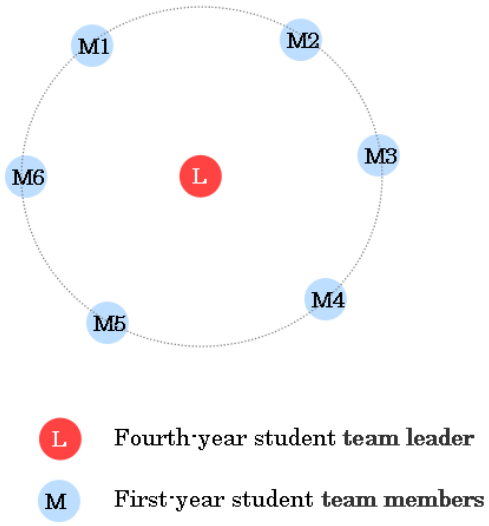


Figure 1.2: First-fourth year integrated design project teams at ETSEQ

This asymmetric team setup has eventually proved to be an excellent laboratory to develop personal competencies such as leadership (Witt *et al.*, 2006).

The education part of the PMP course was initially focused on project management and facilitation skills (Witt *et al.*, 2002). However, while this education is necessary, it is not sufficient to cope with the challenges encountered by fourth-year students with the first-year integrated design project teams. Therefore, the leadership development was introduced to PMP course in 2006-07 academic year as a natural evolutionary step in the efforts to improve the effectiveness of PMP students (Alabart *et al.*, 2008a, b).

ISBN:978-84-693-5423-0/DL:T-1414-2010

The continued improvement efforts revealed also the necessity not only to focus on the team leaders, but also to educate team members with critical social skills (team work, communication and conflict resolution). This way, the team leaders can better leverage their leadership skills.

To help students acquire and develop their leadership competence, PMP course provides them with the enabler processes outlined in Figure 1.3. **Formal training**, done through in-class teaching, equips students with the key concepts relevant to leadership, project management, and facilitation techniques and tools.

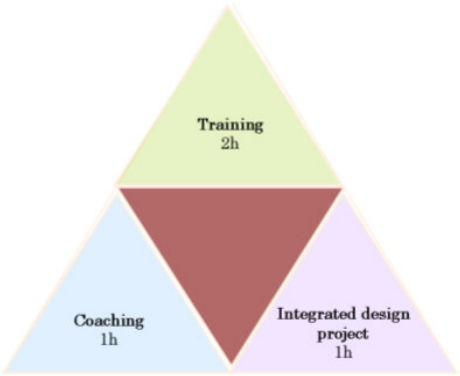
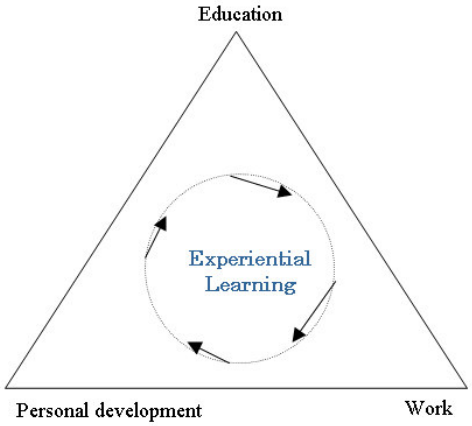


Figure 1.3: The enabler processes implemented in PMP course to foster students' leadership competence



Source: Kolb, 1984

Figure 1.4: Experiential learning as the process that links education, personal development and work

The **integrated design project** provides the leader students with the opportunity to experiment and apply those concepts taught in the training part of the PMP course.

The combined use of **learning journals with personal coaching** is another remarkable enabler process implemented in the PMP course. Learning journals are used as a means to facilitate leader students' reflective thinking process by encouraging them to reflect on their behavior as a leader and on the critical work events they experience during their journey as a leader. Those learning

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

journals, with the consent of leader students, are shared by the **coaches** (course tutors). During the whole academic year, every week, coaches meet with their respective leader students to provide support that is tailored to the individual needs of each student in their development of leadership.

It can be seen in Figure 1.4 that the model implemented at ETSEQ for the development of students' leadership competence captures the main features of experiential learning; students learning by "doing" the task or process they are studying.

In this learning process, learning journals play a key role tool in facilitating and enhancing the process of reflection (Hogan, 1995; Boud, 2001; Hiemstra, 2001; Brady, 2005). The importance of reflection is clear; it constitutes the bridge between experience and learning (Boud *et al.*, 1985). For this reason, learning journals have been used in over thirty-two disciplines (Moon, 1999) to foster learning; examples include nurse education (Hancock, 1999), literature (Ross, 1998), sciences and mathematics (Moon, 1999), statistics (Sgoutas-Emch and Johnson, 1998), art and design, professional academic courses (Francis 1995; Bain *et al.* 1999 as cited in Paton, 2008).

However, it is only recently that learning journals received attention in management and leadership literature. So far, they have been used as a development tool in facilitating the comprehension and retention of MBA course material (Varner and Peck, 2003), in developing management students' self-awareness (Pavlovich *et al.* 2009), in improving individual and team performance (Loo and Thorpe, 2002; Loo, 2002), and in the development of college students' leadership (Roberts, 2008). Additionally they have been suggested as an effective tool in promoting critical management reflection (Gray, 2007) and in the development of leadership competences (Cacioppe, 1998; Sharkey, 1999).

The coaching is now amongst the most widely used executive and leadership development techniques and its use for this purpose has been well-documented in literature (Judge and Cowell, 1997; Thach, 2002; Paige, 2002; Wales, 2003; Goldsmith, 2004; Feldman and Lankau, 2005; Gray 2006; Kets de Vries, 2005).

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

1.3. MOTIVATION FOR THE STUDY

There is a growing understanding that the engineers of today's and tomorrow's world need far more than just the technical competencies. Additional social competencies are not only condition for employment, but also a vital need for every organization (be it non-profit or business) to improve performance. The key social competencies are teamwork, communication and conflict resolution with leadership as the integration factor bringing everything together. Leadership abilities has benefit for the organization in form of higher performance, but also provides higher level of fulfillment for the individual displaying these abilities, be it altruistic or career reasons.

In the recent years, engineering educators have come to realize the particular importance of equipping their students with leadership competence before their graduation, in conjunction with building additional social competencies. Therefore, many engineering schools now try to implement the training and education practices that will transform their students into future engineering leaders.

Despite the plethora of leadership programs scattered across engineering schools and the resources being invested on developing their students' leadership competence scant investigation has been conducted into leadership exercised by engineering leader students and its impact on team performance.

The main goal of this study is to conduct an exploratory search to identify the relevant features of the impact of the leadership exercised by student leaders on the performance of their teams.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

1.4. RESEARCH OBJECTIVES AND HYPOTHESES

The specific hypotheses of this thesis research are the following:

H1: There is a positive relationship between leadership and team performance.

H2: The leaders' personality profiles impact on their leadership performance.

H3: Balanced project teams perform better than unbalanced teams.

The research hypothesizes are detailed in the following pages.

ISBN:978-84-693-5423-0/DL:T-1414-2010

H1:	Basing on the large volume of studies that indicate a link between leadership and team performance (e.g. Hogan *et al.*, 1994; Zaccaro, 2001; Zaccaro and Klimoski, 2002; Schaubroeack and Lam, 2007), current study hypothesizes:	*A positive relationship between leadership performance and team performance*.
H1a:	Previous research indicated that more active and versatile learners consider themselves more frequently involved in leadership behaviors (Brown and Posner, 2001) and that an individual's learning positively predicts group level processes and performances (Hirst *et al.*, 2004). Consistent with this evidence, this study suggests:	*A positive relationship between leadership learning and team performance*.
H1b:	High performance has been argued to be associated with more leadership behavior, on the assumption that, the leader must be engaging in behavior that brings the high performance about (Butterfield and Powell, 1981). Therefore, this study suggests:	*A positive relationship between the number of leadership behaviors shown and team performance*.
H1c:	It has been claimed that successful leaders need to have a behavioral repertoire and ability select the right behavior for the situation (Leban and Zulauf, 2004). In fact, behavioral repertoire has found to have strong positive effects on subordinate, peer, and superior's perception of effectiveness (Hooijeberg, 1996). Thus, the following study proposes:	*A positive relationship between diversity of leadership behaviors and team performance*.
H1d:	It has been claimed that subordinates are in unique position to evaluate leadership effectiveness and performance (Hogan *et al.*, 1994). Based on this and the suggested link between leadership performance and team performance, this study suggests:	*A positive relationship between members' perception of leadership effectiveness and team performance.*

ISBN:978-84-693-5423-0/DL:T-1414-2010

H2: It has been accepted that a leaders personality characteristics can influence leadership effectiveness (Sogunro, 1999). Thus, the present study hypothesizes that:

Leaders' personality profiles impact on their leadership performance.

H2a: Belbin (1981) defines *team role* as "a tendency to behave, contribute and interrelate with others in a particular way." Everybody seems to have preference for one or more of these "team roles" when working with others naturally in a team. There are eight team roles, two of which are possible leader roles (shaper and coordinator). As the students who have a primary role preference for a "shaper" and "coordinator" role tend to behave like a leader in a team, this study hypothesizes the following

Leaders who have clear a primary preference for a leadership role (either "shaper" or "coordinator") will demonstrate better leadership performance than those leaders who don't have.

H3: This hypothesis turns the lens from leadership to "teams" themselves and set out to determine whether the composition of IDP teams have some effect on team effectiveness. Basing on Belbin's (1981, 1993) claims that balanced teams will perform better than unbalanced teams the study proposes that:

Balanced" project teams perform better than "unbalanced" project teams.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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The hypotheses introduced by the current study are summarized in Figure 1.5.

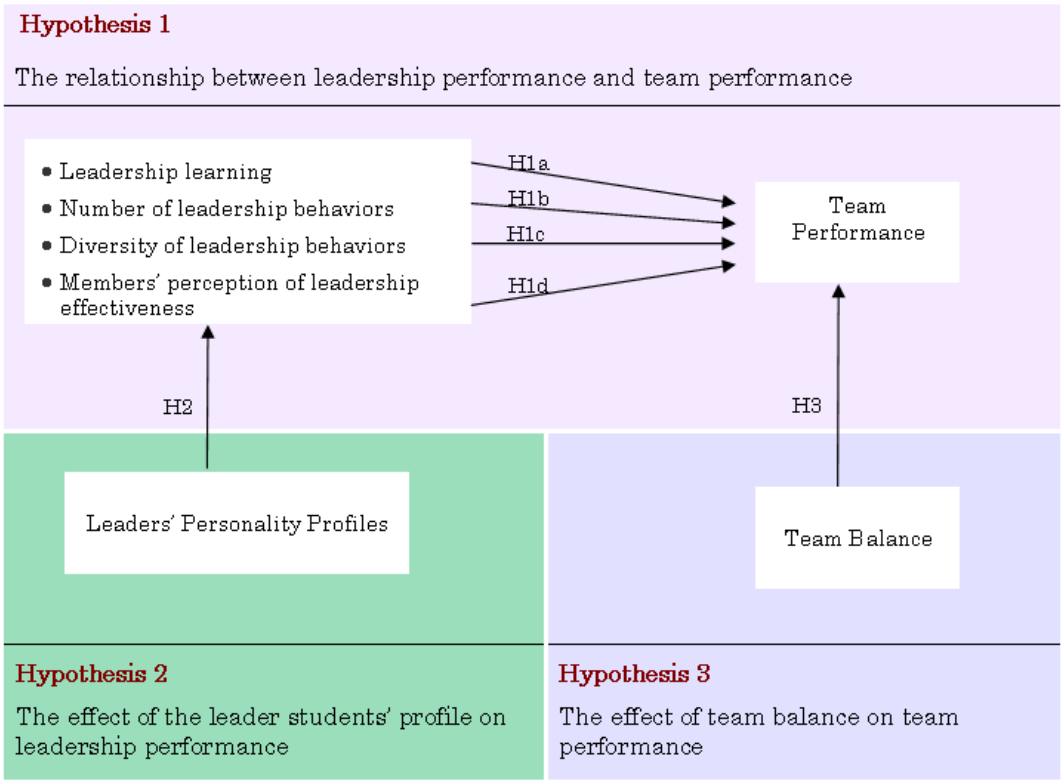

Figure 1.5: Research study hypotheses

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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CHAPTER 2

METHODOLOGY

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2. METHODOLOGY

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2.1. INTRODUCTION

A mixed method approach has been adopted in this study to explore the relevant features of the impact of leadership on team performance.

Quantitative methods have been used to test the study hypotheses and qualitative ones (case studies) to provide an in-depth analysis of the leadership behaviors shown and its impact on the team.

The target sample of the study has been the 4th year Ch.E. students who took on the leadership role of the 1st-4th year integrated design project teams. The data has been collected from both the leader students and their respective teams. Table 2.1 summarizes the type of data collected by different research tools and the measurement of the variables.

For the **leader students,** 5 types of data have been collected: personality profile, number and diversity of the leadership behaviors, members' perception of leadership effectiveness, and leadership learning.

The *leaders' personality profile* has been determined using the following 4 tests:

- Belbin's Self Perception Inventory (BSPI),
- Managerial Style Questionnaire (MSQ),
- Myers-Briggs Type Indicator (MBTI), and
- Schwartz Value Survey (SVS).

The *number and type of leadership behaviors* shown by the leader students have been determined by coding their learning journals and behavioral event interviews (BEIs) against the Leadership Competence Dictionary "Alabart" (Alabart *et al.*, 2008c).

The *member's perception of leadership effectiveness* has been obtained from the member's ratings of leader effectiveness provided in the 360 degree feedback process.

The *leadership learning* has been calculated as the final grades obtained by the leader students in the PMP course.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.1: Research design

Used for	Information for	Variable	Research Tools and Measurement of Variables
Hypothesis Testing	Leader	Personality profile	Personal Tests • Belbin's s Self Perception Inventory (BSPI), • Managerial Style Questionnaire (MSQ), • Myers-Briggs Type Indicator (MBTI), • Schwartz value survey (SVS)
		Leadership behaviors (number & diversity)	• Learning journals • Behavioral event interviews (BEI) • Leadership competence dictionary "Alabart"
		Members' perception of leadership effectiveness	360 degree feedback
		Leadership learning	Final PMP course grade
	Team	Team Performance	Final integrated design project grades
		Team Balance	Belbin's self perception inventory *5different balance measures* • Belbin's Basic Concept • Senior's Modified Measure • Won-Woo and Hojin's Measure • Partington and Harris's Measure • Fisher's task-relationship construct
Research Questions	Leader	Critical events encountered	Behavioral event interviews
Case Studies	Leader	Leadership behaviors	Personal tests, learning journals, behavioral event interviews, 360 degree feedback, and focus group
	Team	Team climate	Team climate survey

ISBN:978-84-693-5423-0/DL:T-1414-2010

For the **team**, 2 types of data have been collected: team performance and team balance.

The *team performance* has been measured by the final grades obtained by team members in the integrated-design project.

The *team balance* has been measured through the team members' responses to Belbin Self Perception Inventory and 5 different types of balance measures have been used.

The *critical events* encountered by the leader students have been collected from the behavioral event interviews conducted with leader students.

To explore in-depth the leadership behaviors exercised by the leader students, a case study approach has been utilized to analyze all the data collected as well as focus groups and team climate survey. Focus groups have been conducted with the members of the team to have their opinion of their leaders' leadership behavior and the team climate survey has been administered to the team to measure the climate in the teams.

2.2. RESEARCH SETTING

Two settings have been used to train and select the leader students: (1) the PMP course which is the enabling processes implemented for the development of leader students' leadership competence, (2) the leadership selection process and its implementation to the PMP course.

2.2.1. PMP COURSE

The PMP course lasts two consecutive 15-week periods with 4 class hours per week (Alabart *et al.*, 2008a-b)[1]. Two hours are devoted to training (e.g. teaching leadership, project management, and facilitation concepts, techniques, and tools). One hour is reserved for the individual coaching process between a PMP instructor and his/her assigned team leaders. The remaining class hour is

[1] These articles are presented in Appendix 2.1 and Appendix 2.2.

ISBN:978-84-693-5423-0/DL:T-1414-2010

devoted to the weekly formal meeting of leaders with their first-year project teams. These enablers are described in detail below.

The **training** component of the PMP is the course syllabus which has been planned to teach the knowledge, skills, and behaviors required by team leaders to perform properly the leader, team administrator, and facilitator roles that may be needed at any given time while doing the project (Flannes and Levin, 2001). The topics covered in the PMP course are summarized in Table 2.2.

Table 2.2: Contents of the PMP course

Roles	Topic
Leader	• High impact leadership behaviors • Listening skills • Giving and receiving constructive feedback • How to provide effective recognition • Selecting a team: team capabilities • Setting team direction • Team development
Team Administrator	• Planning the project: Team Charter • Monitoring the project • Closing-out the project • Performance management
Facilitator	• Core practices and key facilitator behaviors • Fostering participation • Effective decision making • Meeting management • Managing conflict • Process tools

In addition to the in-class teaching, each leader student is formally and individually **coached** by a PMP course instructor throughout the academic year. This coaching process is based on the leader students' learning journal.

Leader students are required to make at least one journal entry per week and they are encouraged to describe critical work events by using the following structure (Spencer and Spencer, 1993):

1. What was the situation? What events led up to it?
2. Who was involved?
3. What did you think, feel, or want to do in the situation?

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4. What did you actually do or say?
5. What was the outcome?

These journals play a pivotal role in team leaders' leadership developmental process since they provide them with:

1. An opportunity to record and reflect on critical work events, either positive or negative.
2. A means by which PMP's instructors can offer useful feedback and support to the team.
3. An opportunity to practice critical and evaluative thinking with respective to actions, and experiences.
4. A means of integrating theoretical learning with workplace leadership practice.
5. A means of "social hygiene" to allow the team leader to vent in a constructive manner.

Before the coaching session between the PMP instructor and the student can analyze and interpret individually the student's learning journal and during the meeting they can discuss critical events and patterns of behavior and relate them to the skills, knowledge, and effective behaviors that are introduced in the education component of the course. In addition to these coaching sessions, the leader students can ask his/her assigned instructor to meet whenever they feel the need to do so.

The leader students hold **formal meetings** with their team one hour per week during the academic year to work on the elaboration of the design project.

2.2.2. LEADERSHIP SELECTION PROCESS

Selection of team leaders is of prime importance to both first year project teams and to PMP course itself as effective and healthy functioning of first-year teams might be jeopardized by a fourth year leader's failure in leading the team (Özgen et al., 2008a)[2].

[2] Article is presented in Appendix 2.3

ISBN:978-84-693-5423-0/DL:T-1414-2010

The number of available leadership positions in PMP course is limited by the number of first-years students enrolled and generally only one third of the PMP students can actually take on the leadership role.

Deciding which student should become a team leader is not easy and definitely should not be done in a **haphazard** manner. Recent research regarding leadership development has heightened the importance of evaluating the potential of candidates for leadership positions. As put by Popper (2005):

> "*just as the potential of candidates for pilots' courses is examined, there is room to evaluate the potential of candidates for leadership positions.*"

This evaluation is required to spot people who will succeed in a leadership role. In order to make such prediction, however, it is essential to identify key dimensions associated with leadership effectiveness; in turn the leadership potential. So far, however, no single dimension has been reported as to be making the sole contribution to leadership potential. Various dimensions have been suggested by different researchers as to be predictive of leadership success. Our review of relevant literature identified the following dimensions as being *highly* related to leadership potential:

- motivation to lead,
- personality preference, and
- leadership competence

The above mentioned dimensions therefore constitute the basis for the construction of the leader selection process implemented in the PMP course. The following paragraphs present the importance of including aforesaid dimensions in the evaluation process of leadership potential.

- **Motivation to lead**: Motivation to lead is defined as "*a construct that affects a leader-to-be's decision to assume leadership roles and responsibilities and that affect his or her intensity of effort at leading and persistence as a leader*" (Chan and Drasgow, 2001). This dimension is particularly important in identification of leadership potential because an individual would not become a leader without this motivation (Popper, 2005; Popper and

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Mayseless, 2007). For a fourth-year student leader to succeed, it is important that he or she be ready to take on this responsibility and has the adequate motivation to do so. If the fourth year student is not willing to become a leader, the leadership training and experience provided in the PMP course would be unworthy as these students will not practice them. Therefore selection should relate to the question of motivation.

- **Personality Preferences**: The issue of personality has been an intriguing subject in the field of leadership for some time now. A substantial body of research has been devoted to identify the possible linkages between personality and leadership (House and Howell, 1992; Church and Waclawski, 1998; Atwater *et al.*, 1999; Judge *et al.*, 2002; Popper and Mayseless, 2007). Evidence from these studies demonstrated that personality variable can be used to determine who is likely to emerge as a leader, exercise effective leadership (Judge *et. al.*, 2002; Atwater *et al.*, 1999), to learn and develop it over time (Popper and Mayseless, 2007). Just as there are personality preferences associated with effective leadership, there are also other individual differences and qualities that may cause failure in leading (Najar *et. al.*, 2004).

- **Leadership Competence**: Leadership is a competence cluster and contains several competences that when applied appropriately result in desired outcomes in relation to leadership.

In addition to the dimensions stated above, **academic eligibility** has been also considered as relevant for fourth-year students' effectiveness in leadership. Since the design project involves the application of the theoretical concepts from first-year courses, a fourth-year student who failed first year courses may not be able to guide the teams in an effective manner. It has been also considered that a leader with pending courses from first-year may not also seem so trustworthy to first-year students. Therefore, a fourth dimension, academic eligibility, has been included as relevant for evaluating fourth-year students' leadership potential.

Consequently, it was decided to look for the demonstration of academic eligibility, motivation to lead, personality preference, and leadership competence when choosing the team leader. This multi-facet approach for the leader

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selection covers the relevant dimensions deemed important for the leadership potential. Therefore this selection aims that;

- The first-year project teams are lead by those students who have the *highest potential* to do so. It eliminates any possible criticism of choosing the leaders depending solely on one factor like their academical achievement, personality, or such.
- The return on leadership development investment would be high for the PMP course. In other words, this selection identifies the students in whom should the leadership development efforts be invested. Because it is harder to build and strengthen the leadership in those individuals who lack that potential, it requires the investment of a great deal of time and experience to do so.
- The students are placed into the roles that they would feel themselves most comfortable in assuming and fulfilling.

The measurement of these above mentioned dimensions in the selection process is shown in Table 2.3.

Table 2.3: Variables in the leader selection process

Dimension	Measurement
Academic eligibility	Academic records are confidential information therefore it is not possible to obtain them from the university. Therefore, students have been directly asked if they had approved the first-year courses through the use of a survey.
Motivation to lead	Students have been asked one very concrete question "*Would you like to become one of the leaders of the first-year IDP teams*?"
Personality	Belbin's Team Role Inventory, Myers-Briggs Type Indicator (MBTI), Managerial Style Questionnaire.
Leadership Competence	Interviews with the students

For the Belbin's self perception inventory, students' with preferences for "**shaper**" and "**coordinator**" roles are considered relevant. "Coordinator" is the mature and confident guiding and controlling leader who organizes and controls

ISBN:978-84-693-5423-0/DL:T-1414-2010

the activities of the team, clarifies goals, promotes decision making. On the other hand, "shaper" is the challenging, dynamic confrontational leader who pushes the members to excel obstacles. Therefore, "shaper" and "coordinator" role preferences have been inferred as the preferential team roles for a 4th-year team leader.

For the MBTI, it has been argued that life's natural administrators are the **ESTJ**s while life's natural leaders are the **ENTJ**s (Kroeger and Thuesen, 1992). In a similar vein, ESTJ has been proposed as a preference for leaders (Milroy, 2000a). Drawing on these sources; ESTJ and ENTJ have been selected as personality-type preferences to be looked in the candidates.

For the Managerial style, preferences for the "**authoritative**" and "**coaching**" style have been thought necessary for the 4th year student leaders. "Authoritative" (sometimes called the "visionary") leader provides a clear vision that motivates the followers to be creative in the pursuit of goals and objectives. This type of leaders often acts as agents of change and generates the most positive climate. "Coaching" leader is skilled at identifying and building on the potential of followers. Focusing on the personal development this style enables followers to cope with challenges, experiment with new ideas, and accept responsibility for failure.

Based on the theoretical frame explained above, the sequential steps followed in the selection of leader students are illustrated in Figure 2.1. The **selection process** took place in the beginning of the academic year.

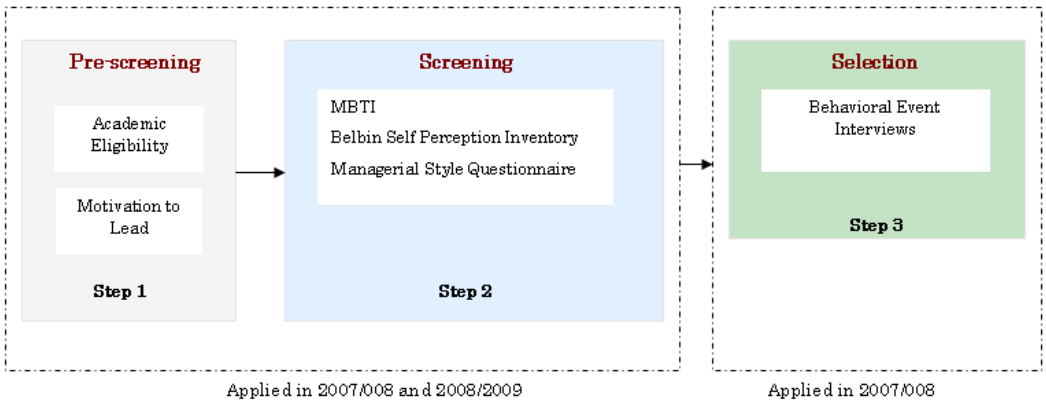

Figure 2.1: Schematic diagram of the steps in leader selection

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The **first step**, pre-screening (the distribution and collection of the survey for the academic eligibility and motivation) to lead has been carried out in the first week of the academic semester.

The **second step**, screening, involves the application of personal tests. In this step, students have been instructed about the nature and underlying theory of the tests and have been acknowledged that there is no right or wrong personality preference and that these personality preferences would be helpful in positioning them to roles that they would be feeling most comfortable with. After the first step, during a two-week-period three tests (MBTI, Belbin self perception inventory, Managerial style questionnaire) have been administered to all of the students in the PMP course. The results from step 1 and step 2 yielded a list of candidates.

During the 2007-2008 academic year, these candidate students have been invited to the behavioral event interviews for final selection. During the 2008-2009 academic year, this step has not been carried out.

2.3. RESEARCH TOOLS

The ten different research tools utilized in the current study are summarized in Table 2.4. The first four tools (BSPI, MSQ, MBTI, and SVS) have been used to identify the leader students' personality profile.

Learning journals and behavioral event interviews have been utilized to determine the leadership behaviors shown by the leader students. BEIs have been used also to identify the most common type of critical events encountered by the leader students.

Leadership competence dictionary "Alabart" has been used in the codification of learning journals and interviews for the identification of leadership behaviors. This dictionary has been also used as the questionnaire in the 360 degree feedback process.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.4: Research tools used in the current study

Research Tools	Use
Belbin's self perception inventory (BSPI) Managerial style questionnaire (MSQ) Myers-Briggs type indicator (MBTI) Schwartz value survey (SVS)	To determine the leader students' personality profile
Learning journals	To identify leadership behaviors
Behavioral event interviews (BEIs)	To identify leadership behaviors and the critical incidents encountered
Leadership competence dictionary "Alabart"	To code the leadership behaviors in learning journals and in BEIs and form the questionnaire for 360 degree feedback
360 degree feedback	To determine members' perception of leadership effectiveness
Team climate survey	To determine the climate in the teams
Focus group	To have the opinions of the members about their leaders

Team climate survey has been applied to measure the climate in the teams and the focus groups have been conducted to gather members' opinion about their leaders.

These research tools are described in detail in the following subsections.

2.3.1. BELBIN SELF PERCEPTION INVENTORY

This section provides an overview of the Belbin's team roles as well as the will the description of the Belbin's Self Perception Inventory (BSPI).

Overview of the Team Role Theory

R. Meredith Belbin, in 1981, introduced the concept of "team role" after nine years of observation, experimentation, and hypothesis testing with *management teams* playing management games at Henley Management College.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

This work was centered on the composition of teams and their effectiveness[3]. Initially, the teams were formed on the basis of members' mental ability and the results were rather surprising; the teams comprised of *clever* people finished the management game last. Experiments were repeated and the results revealed that average mental ability was not a decisive advantage in the management game.

In the following round, the teams were formed on the basis of the members' personalities and experiments were done with teams of similar personality characteristics[4]. The results demonstrated that teams with similar people had characteristic strengths and weaknesses. To identify these characteristics, other experiments were conducted together with the observation of members' behaviors during the meetings.

Consequently, clusters or patterns of behaviors that make a positive contribution to the team effectiveness were identified; "*team roles*". Team role is defined by Belbin as (1993; p.24):

> "*a tendency to behave, contribute, and interrelate with others at work in certain distinctive ways*."

Belbin, initially, identified eight separate team roles which he believed that were necessary for a team to be successful. Later, in 1993, he introduced the ninth-team role, the "specialist", and renamed the two of the roles. The "chairman" became "co-ordinator" and the "company worker" became the "implementer". The brief descriptions of the Belbin's team roles are presented in Table 2.5.

The "**shaper**" offers dominant task-leadership and is full of drive to make things happen and get things going. Shaper doesn't mind being challenged and is always ready to challenge the others. This person is quite happy to push his/her own view forward and tends to be impatient when seeking to impose shape on group discussions or the outcome of group activities. They tend to get easily nervous and provoked.

[3] Team effectiveness was measured in terms of the financial results in the management games.

[4] A battery of psychometric tests was administered to the participants to identify their personal characteristics (i.e.Watson-Glaser Critical Thinking Appraisal, the Cattell 16PF, and Personal Preference Questionnaire).

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.5: Brief description of Belbin's team roles (Belbin, 1993)

Name	Symbol	Behavioral descriptor	Positive Qualities	Allowable Weaknesses
Shaper	SH	Demanding, coercing, confrontational leader. Pushes members to excel.	Challenging, dynamic, thrives on pressure. Has the drive ad courage to overcome obstacles.	Can provoke others. Hurts people's feelings.
Co-ordinator	CO	Guiding and controlling leader. Knows the abilities of the members well.	Mature, confident, a good chairperson. Clarifies goals, promotes decision-making, delegates well.	Can be seen as manipulative. Delegates personal work.
Plant	PL	Innovator and problem solver, the "idea" member.	Creative, imaginative, and unorthodox. Solves difficult problems.	Ignores details. Too preoccupied to communicate effectively.
Implementer	IMP	Implements agreed upon plans.	Disciplined, reliable, conservative, and efficient. Turns ideas into practical solutions.	Somewhat inflexible. Slow to respond to new possibilities.
Teamworker	TW	Facilitates team functions and mediates issues within the team.	Cooperative, mild, perceptive, and diplomatic. Listens, builds, averts friction, and calms the waters.	Indecisive in crunch situations. Can be easily influenced.
Resource investigator	RI	Contact person for resources external to the team, brings resources into the team.	Extrovert, enthusiastic, communicative. Explores opportunities. Develops contacts.	Overoptimistic. Loses interest once initial enthusiasm has passed.
Monitor evaluator	ME	Analyzes, evaluates proposed solutions and choices.	Sober, strategic, and discerning. Sees all options. Judges accurately.	Lacks drive and ability to inspire others. Overly critical.
Completer finisher	CF	Focuses on details and meeting deadlines.	Painstaking, conscientious, anxious. Searches out errors and omissions. Delivers on time.	Inclined to worry unduly. Reluctant to delegate. Can be a nit-picker.
Specialist	SP	Professional expertise.	Single-minded, self-starting, dedicated. Provides knowledge and skills in rare supply.	Contributes only a narrow front. Dwells on technicalities. Overlooks the "big picture".

ISBN:978-84-693-5423-0/DL:T-1414-2010

The "**co-ordinator**" has a clear view of team objectives and controls the team in a typical head-of the table manner, recognizes where the team's strengths and weaknesses lie, and coordinates and controls the work of the members. The "co-ordinator" has the natural ability to get the best of everyone's potential. This person is not necessarily the smartest or most creative person in a team, but is confident and mature.

The "**plant**" is the major source of original ideas and proposals. This person challenges the traditional way of thinking about things and sometimes becomes so imaginative that the others can not see the relevance of what s/he is saying

The "**implementer**" turns concepts and plans into practical working procedures. Such person works very hard and shows willingness to do what has to be done, even if it is not interesting or pleasant. This person tends to be well-organized, self-disciplined, and methodical but may have difficulty in being flexible.

The **teamworker** tends to be skilled at listening to others, facilitating communications and dealing with difficult people and so this person is aware of the others in the team, their needs and concerns. This person tries to increase harmony and reduce conflict.

The "**resource investigator**", rather than generating ideas, picks up the ideas and information from people, usually, external to the team and develops them. This person tends to be communicative and usually has the strongest contacts and networks in the group.

The "**monitor evaluator**" is able to step back and evaluate ideas and suggestions to enable the team to take balanced decisions. The monitor evaluator can become overcritical and is not usually inspiring or encouraging.

The "**completer finisher**" is motivated to finalize anything that is started, drives the deadlines, and ensures that they are achieved. This person follows through relentlessly and is effective at checking the details.

The "**specialist**" provides specialist skills and knowledge. They might fail to see the big picture.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The summary on the team roles presented above is based on various resources (Belbin, 1981-1993; Hayes, 2002, Henry and Stevens, 1999). The instrument used to identify team roles is described below.

Belbin's Self-Perception Inventory: Identification of Team Roles

To identify an individual's natural propensity towards filling each team role, Belbin developed the self-perception inventory (can be found in Belbin, 1981; p.147).

The test consists of 7 sections and each section involves eight sentences (see Table 2.6 for a sample section). The respondents, for each section, distribute a total of ten points among the sentences which they think best describes their behavior. In other words, individuals distribute a total of 70 points across seven sections.

Some participants prefer to assign a lot of points to a few statements and some others prefer to spread the points more evenly. Those points are later transposed to SPI analysis sheet to obtain total team-role distribution scores for a given individual (Belbin, 1981).

Table 2.6: Sample section from Belbin's Self Perception Inventory

Section 2: If I have a possible shortcoming in teamwork, it could be that:
1. I am not at ease unless meetings are well structured and controlled and generally well conducted.
2. I am inclined to be too generous towards others who have a valid viewpoint that has not been given proper airing.
3. I have a tendency to talk too much once the group gets on to new ideas.
4. My objective outlook makes it difficult for me to join in readily and enthusiastically with colleagues.
5. I am sometimes seen as forceful and authoritarian if there is a need to get something done.
6. I find it difficult to lead from the front, perhaps because I am over-responsive to group atmosphere.
7. I am apt to get caught up in ideas that occur to me and so lose track of what is happening.
8. My colleagues tend to see me as worrying unnecessarily over detail and the possibility that things may go wrong.

ISBN:978-84-693-5423-0/DL:T-1414-2010

The *highest score* obtained on a team role represents the "primary team role". The second highest score shows the "back-up roles" and *the lowest two scores* imply "areas of weakness".

The example in Table 2.7 demonstrates an actual student's team role score distribution. This student's primary team role preference was "shaper" (the highest score). His/her back-up role was "completer finisher" (the second highest score). The roles "co-ordinator", "teamworker", and "plant" were the areas of weaknesses for this student (the lowest scores).

Table 2.7: Example demonstrating an individual's Belbin team-role score distribution and identification of his/her primary team role

IMP	CO	SH	PL	RI	ME	TW	CF	Primary Team Role
9	6	16	6	8	9	6	12	Shaper

2.3.2. MANAGERIAL STYLE QUESTIONNAIRE

A brief overview of the theory behind the managerial styles along with the explanations on the Managerial Style Questionnaire are presented in this section.

Overview of the Managerial Styles

The study on managerial styles originates from Litwin and Stringer's study on motivational and organizational climate where managerial style was proposed to be the primer driver of the climate[5] (1968 as cited in Anderson and Zhu, 2002).

Consulting firm Hay/McBer's research, drawn on 3781 executives, identified six different types of managerial styles (Table 2.8) and the managerial style being defined as (Anderson and Zhu, 2002):

> "*the patterns of behavior an individual manager uses across the full range of management situations.*"

[5] Climate is defined as the sense of "how it feels to work here" as experienced by the workers.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.8: Descriptions of the six managerial styles

Managerial Style	Definition	Typical Sentence	When appropriate	Impact on climate
Coercive	The primary objective is immediate compliance. Relies on "directives" rather than "direction," and uses very little dialogue. Close mentoring is supported by negative, corrective feedback with an implied, if not explicit, threat. Efforts to motivate are focused mainly on the consequences of non-reliance.	"Do it because I say so"	In a crisis or to start a turnaround.	Strongly negative
Authoritative	The primary objective is to provide long-term direction and vision for employees. Relies on dialogue with others as well as the manager's unique perspective on the business to establish a vision. The manager keeps others engaged by assuring them that the direction is in the long-term best interests of the group and the organization, and by mentoring performance toward the established goals with balanced feedback to employees.	"Let's remind ourselves of the larger purpose"	When change requires new vision or to provide clear direction.	Most strongly positive
Affiliative	The primary objective is to create harmony and avoid conflict. This manager spends a lot of time cultivating relationships with employees. This style tends to reward personal characteristics and avoid performance-related confrontations.	"People first, task second"	To motivate people in stress or to heal team conflicts.	Highly positive
Democratic	The primary objective is to build commitment through consensus among the employees and to generate new ideas. This is a very participative style and relies on the ability of employees to establish their own direction and to resolve their conflicts constructively. Is characterized by a lot of meetings, listening, recognition of adequate performance, and little criticism of low performance.	"Let's work it out together"	To build consensus or get employee input.	Highly positive
Pacesetting	The primary objective is task accomplishment to high standards of excellence. This style tends to lead by modeling. They establish themselves as the standard and apprehensive about delegating. Their concern with the immediate task accomplishment makes them disinclined to collaborate with peers.	"Do it my way"	To get quick results from a motivated and competent team.	Highly negative
Coaching	The primary objective is the long-term development of others. This style helps individuals to identify their unique strengths and weaknesses. This typically involves sitting down with the employee and conducting a candid, mutual assessment of the employee's strengths and weaknesses in the light of his/her aspirations. This manager helps the employees to establish a development plan, and provides ongoing support and feedback.	"Let me help you develop"	To help improve performance or develop strengths in employees.	Highly positive

Source: Goleman, Boyatzis, and McKee (2002), Anderson and Zhu (2002)

ISBN:978-84-693-5423-0/DL:T-1414-2010

Admittedly, each of the six managerial styles is necessary for a skilled manager because the key to a manager's effectiveness is his/her ability to select and use the appropriate managerial style demanding on the requirements of the situation rather than relying on only one or two styles to deal with all situations. The following section provides information on the managerial style questionnaire.

Managerial Style Questionnaire

The Managerial Style Questionnaire (MSQ) is made up of 36 paired statements and respondents are asked to choose from each pair the one statement that they consider is most applicable to what they do in their job. The questionnaire provides respondents with one managerial dominant style.

The raw scores obtained on six managerial styles (coercive, authoritative, affiliative, democratic, pacesetting, and coaching) are transformed to percentile scores according to the questionnaire guidelines (see Table 2.9 for an example). The student shown in this example has a dominant "authoritative" style.

Table 2.9: Example demonstrating the transformation of raw scores to percentile score

	Coercive	Authoritative	Affiliative	Democratic	Pacesetting	Coaching
Percentile	60	90	50	20	35	40
Raw Score	5	9	4	6	4	8

2.3.3. MYERS-BRIGGS TYPE INDICATOR (MBTI)

This section first gives a brief overview of the personality type theory and then provides explanations on the MBTI® instrument to measure the personality types.

Overview of the Personality Type Theory

Personality type theory is based on the work of Jung (1921) which proposes that individuals have in-born preferences for the way they gather information, make decisions, and gain energy.

ISBN:978-84-693-5423-0/DL:T-1414-2010

To make the theory developed by Jung more understandable and usable, Isabel Briggs Myers and her mother Katharina Cook Briggs developed the Myers-Briggs Type Indicator® (MBTI®) instrument (Myers and McCaulley, 1998). This instrument is used to explain the behavior of a wide range of individuals and intends to measure types (preferences) rather than traits (McCrae and Costa, 1988). The framework is built on the following assumptions (directly taken from Huszczo, 2008; p. 23-24):

- "An individual's personality type is determined by his or her preferences in four of opposites, known as preference pairs."
- "Neither side of a preference pair is better than the other; they complement in each other."
- "People have a natural or more accessible preference for one side of a preference pair over the other. Just as you may be naturally right-handed, you can use your left hand when needed but it just won't seem comfortable to you."
- "The key to a well-developed personality is capitalizing on your preferences while accepting others who show opposite preferences, instead of trying to be all things to all people or insisting that everyone share your preferences."

MBTI assesses individuals' personality types in terms of four scales, representing the four psychological type dichotomies (Table 2.10).

The first scale, **Extraversion-Introversion (E-I)**, focuses on where the individuals direct energy as well as receive energy. People with a preference for "extraversion" are energized by interacting with others and taking action. They are sociable, expressive and they think out loud. The people with a preference for "introversion" draw energy and renewal from time alone. They can be seen as private.

The second scale, **Sensing-iNtuition (S-N)**, describes how the individuals take in and process information. People with a preference for "sensing" tend to use their five senses to focus on facts, details, and realities. They prefer the factual and concrete. Those with a preference for "intuition" tend to view the

ISBN:978-84-693-5423-0/DL:T-1414-2010

world through possibilities. They are imaginative and creative and focus on future possibilities.

The third scale, **Thinking-Feeling (T-F)**, focus on how individuals make decisions. People with a preference for "thinking" tend to rely on logic. They are analytical and they use cause and effect reasoning to make their decisions. Those with a preference for "feeling" are guided by personal values and they strive for harmony.

Table 2.10: Four preference pairs of the MBTI® Instrument (Huszczo, 2008; p. 25)

	People with a preference for:	*People with a preference for:*
E-I scale Energy sources	**E** Extraversion Tend to direct energy toward and receive energy from the external world of people, activities, and things.	**I** Introversion Tend to direct energy toward and receive energy from the internal world of ideas and experiences.
S-N scale Information take-in	**S** Sensing Tend to perceive immediate, tangible facts through the five senses.	**N** iNtuition Tend to first perceive possibilities, patterns, and relationships through insight
T-F scale Decision Making	**T** Thinking Tend to make decisions based on logical analysis with a focus on objectivity and detachment.	**F** Feeling Tend to make decisions based on personal or social values with a focus on understanding and harmony
J-P scale Relationship with the outer world	**J** Judging Tend to live in a decisive, orderly, planned way and strive for closure in the external world.	**P** Perceiving Tend to live in a flexible, spontaneous way and strive to stay open to new information in the external world.

The fourth scale, **Judging-Perceiving (J-P)**, focuses on how the individuals deal with the outer world. People with a preference for "judging" tend to emphasize planning, time frames, and task completion and they tend to act decisively. Those who have a preference for "perceiving" tend to be flexible, spontaneous, and enthusiastic. They prefer the open-ended.

The combinations of the four types produce 16 possible four-letter type combinations. For example, an individual typed ISTJ would exhibit preferences

ISBN:978-84-693-5423-0/DL:T-1414-2010

for "introversion", "sensing", "thinking", and "judging". Descriptions of the 16 type profiles can be found in Appendix 3.1.

The MBTI Instrument

Self- scorable, Form G of the MBTI (Spanish version) was used in this study (Briggs-Myers, 1991). This form consists of 126 forced-choice items, of which 94 are scored.

Students' preference scores have been calculated following the procedure outlined in MBTI instrument manual (Myers & McCaulley, 1998). In the first step, the preference scores have been obtained on four preference pairs (i.e. "E", "I", "S", "N", "T", "F", "J", and "P"). Next, the scores on preference pairs have been compared. The highest score indicated the preference on that pair. For example, the individual presented in Table 2.11 exhibited preferences for "introversion", "sensing", "thinking" and "judging" (ISTJ).

Table 2.11: Example demonstrating the individuals' pair preferences

EI Scale		SN Scale		TF Scale		JP Scale	
E	**I**	**S**	N	**T**	F	**J**	P
2	22	16	8	28	3	24	2

The maximum and minimum scores that can be obtained on each preference pairs (scales) are shown below:

Extroversion	1 to 51
Introversion	1 to 57
Sensing	1 to 67
iNtuition	1 to 51
Thinking	1 to 65
Feeling	1 to 39 for males; 1 to 43 for females
Judging	1 to 55
Perceiving	1 to 61

2.3.4. SCHWARTZ VALUE SURVEY

An overview of the value theory and the survey developed by Schwartz to measure human value types are described in this section.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Overview of the Value Theory

The centrality of the "value concept" was emphasized by Rokeach (1991, as cited in Schwartz, 2006) with the following sentence:

> "*The value concept, more than any other, should occupy a central position……[is] able to unify the apparently diverse interests of all the sciences concerned with human behavior*."

Schwartz and Bilsky (1987, 1990) proposed the theory of the universal content and structure of human values. The value theory conceptualizes values by incorporating the following common features of values (Schwartz, 1996, 2009):

(1) **Values are beliefs.** But they are beliefs tied inextricably to emotion. When values are activated, they become infused with feeling. People for whom independence is an important value become aroused if their independence is threatened, despair when they are helpless to protect it, and happy when they can enjoy it.

(2) **Values refer to desirable goals** that people strive to attain. People for whom helpfulness is an important value are motivated to pursue this goal.

(3) **Values transcend specific actions and situations**. They are abstract goals and the abstract nature of values distinguishes them from concepts like norms, attitudes, which usually refer to specific actions, objects or situations.

(4) **Values serve as standards of criteria**. Values guide the selection or evaluation of actions, policies, people, and events. People decide what is good or bad, justified or illegitimate, worth doing or avoiding, based on possible consequences for their cherished values.

(5) **Values are ordered by importance** relative to one to another. People's values form an ordered system of value priorities that characterize them as individuals. Do they attribute more importance to achievement, justice, or tradition?

(6) **The relative importance of multiple values guides action.** Any attitude or behavior typically has implications for more than one value. Values contribute to action to the extent that they are relevant in the context and important to the actor.

These features apply to *all* values but the "type of goal or motivation" expressed by the value is what distinguishes one value from one another (Schwartz, 2006). Schwartz (1992) defines ten motivationally distinct value types (Table 2.12).

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.12: Value types in Schwartz's value theory

Value type	Definition	Exemplary values
Power	Social status and prestige, control or dominance over people and resources	Social power, authority, wealth
Achievement	Personal success through demonstrating competence according to social standards.	Successful, capable, ambitious, influential.
Hedonism	Pleasure and sensuous gratification for one self.	Pleasure, enjoying life.
Stimulation	Excitement, novelty, and challenge in life.	Daring, a varied life, an exciting life.
Self-direction	Independent thought and action-choosing, creating, exploring	Creativity, freedom, independent, curious, choosing own goals.
Universalism	Understanding, appreciation, tolerance, and protection of the welfare of all people and for nature.	Broadminded, wisdom, social justice, equality, a world at peace, a world of beauty.
Benevolence	Preservation and the enhancement of the well-fare of people with whom one is in frequent personal contact.	Helpful, honest, forgiving, loyal, responsible.
Tradition	Respect, commitment and acceptance of the customs and ideas that traditional culture or religion provide the self.	Humble, accepting my portion in life, devout, respect for tradition, moderate.
Conformity	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.	Politeness, obedient, self-discipline, honoring parents and elders.
Security	Safety, harmony, and stability of society, of relationships, and of self.	Family, security, national security, social order, reciprocation of favors.

Source: Schwartz, 1992-1996

These ten motivationally distinct value types are hypothesized to be in a circular structure which presents the motivational continuum of the values (See Figure 2.2). That is to say, the values with similar underlying motivations are located close to each other on the circle (e.g. achievement and power) and the values with antagonistic underlying motivations are located distant to each other (e.g. achievement and benevolence).

Note: Figure from Rice, 2006

Figure 2.2: Theoretical model of relations among ten motivational types of values

Figure 2.2 also presents the four higher-order value types and two of them oppose the other two; **Self-enhancement vs. Self-transcendence** and **Openness to Change vs. Conservation**.

The values in "self-enhancement" (achievement and power) emphasize the pursuit of self-interest whereas the values in "self-transcendence" (benevolence, universalism) involve concern for the well-fare and concern for others.

The values in "openness to change" (stimulation, self-direction) emphasize independent action and thought whereas the values in "conservation" (conformity, tradition, security) emphasize self-restriction, order, and resistance

ISBN:978-84-693-5423-0/DL:T-1414-2010

to change. Hedonism value shares elements from both "openness to change" and "conservation".

Schwartz Value Survey (SVS)

Schwartz (1992) developed an instrument to measure people's values which is known as Schwartz Value Survey (SVS). This survey contains 57 items that expresses an aspect of the motivational goal of one value. In parenthesis, an exploratory phrase is provided to further specify the meaning of the item. For example, PLEASURE (gratification of desires) is an item for the hedonism value.

The respondents are asked to rate each value items "*as a guiding principle in MY life*" using the following 9 point-scale:

7	(of supreme importance),	2,1	(unlabelled),
6	(very important),	0	(not important),
5,4	(unlabeled),	-1	(opposed to my values)
3	(important),		

In this study, the Spanish version[6] of SVS was utilized. The score for the importance of each value is calculated as the mean of the scores given on the items designated a priori as markers of that value. The minimum number of items that measure a value is 3 (hedonism) and the maximum is 8 (universalism).

Internal consistency coefficients (alpha) for each value dimension were calculated based on the sample in this study (Table 2.13).

The alpha coefficients ranged between 0.37 (power) and 0.76 (hedonism). Previous literature reported a similar alpha coefficient ranges for value types; 0.45 to 0.72 (Tremblay and Ewart, 2005; $N_T = 98$); 0.45 to 0.79 (Sarros and Santora, 2001; $N_T = 181$). Low alpha values are largely due to the small number of items per scale.

[6] Obtained by personal contact with Dr. Schwartz.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.13: Internal consistency coefficients for each value type based on the present study ($N_T = 63$)

Value Type	Alpha coefficient
Power	0.37
Achievement	0.60
Hedonism	0.76
Stimulation	0.65
Self-direction	0.42
Universalism	0.72
Benevolence	0.45
Tradition	0.52
Conformity	0.61
Security	0.66

2.3.5. LEARNING JOURNALS

Leader students are required to make at least one journal entry per week and they are encouraged to describe critical work events as has been described in section 2.2.1 the PMP course.

2.3.6. BEHAVIORAL EVENT INTERVIEWS (BEIs)

The objective of the behavioral event interview (BEI) is to get very detailed behavioral descriptions of how a person goes about doing his/her work (Spencer and Spencer, 1993). The questions are based on real situations and the interviewee is asked to describe the specific behaviors, thoughts, and actions s/he has shown in real critical situations.

The BEIs have been conducted with the leader students and they have been asked to reconstruct between four and six significant events that they experienced while working with their team and in which they felt particularly effective or ineffective.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Prior to the interviews, PMP instructors reviewed the leaders' learning journals to identify potential critical incidents to catalyze the interview in case the student gets blocked when trying to think of critical incidents. Example interview questions are shown in Table 2.14. The protocol used in the BEIs can be found in Appendix 3.2.

All the BEIs have been tape-recorded and then transcribed into a word document.

Table 2.14: Examples questions asked during the BEIs

How was the situation? What had happened before? What caused it?
What events led to this situation?
Who was involved?
What were you thinking about this? How did you feel? What did you want to do in that situation?
What did you do / say really?
What was the outcome? What happened as a result of all this?

2.3.7. LEADERSHIP COMPETENCE DICTIONARY "ALABART"

The leadership competence dictionary "Alabart" (Alabart *et al.*, 2008c) has been designed to support the educational process implemented in the PMP course and used in this study:

- To codify the leadership behaviors shown by the leader students.
- As a 360 degree feedback questionnaire to identify leadership effectiveness as measured by the members' perception.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The Competences Defined in the Dictionary

The dictionary constitutes eight competences which have been identified by analyzing the Fundamental Concepts of Excellence (2003) of the EFQM Excellence Model (2003) which are illustrated in Figure 2.3. The descriptions of the eight leadership competences are provided in Table 2.15.

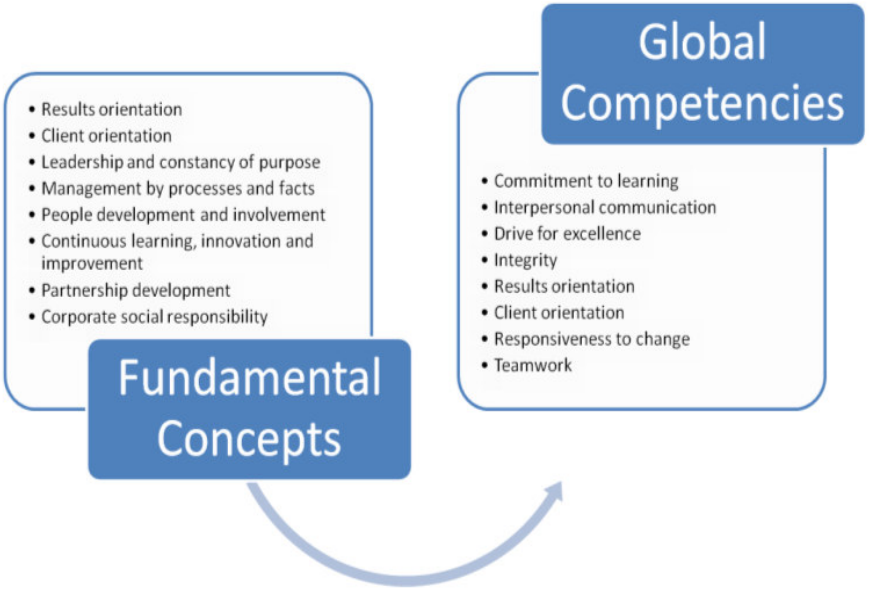


Figure 2.3: The competences underpinning leadership and the fundamental concepts of the EFQM excellence model

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.15: Descriptions of the eight competences that form the Leadership Competence Dictionary Alabart

Competences	Description
Commitment to Learning	Takes responsibility for his/her own learning, acquiring and refining the knowledge, skills and abilities / attributes to improve performance, for development and suitability for job and to contribute to continuous improvement. Develop others' ability to perform their duties and contribute to the organization. Promotes learning or long-term development for others.
Interpersonal Communication	Has the ability to clearly transmit and receive information and communicate effectively with others, considering their views in order to respond appropriately. The purpose of interpersonal communication can be: a) to understand others, b) to convince others, or c) to mobilize others with a vision and convincing and compelling mission.
Drive for Excellence	Has the motivation and ability to challenge the status quo and make things better each time, taking advantage of learning to generate opportunities for improvement and innovation and make the change happen.
Integrity	Harmonizes honestly one's words and feelings with thoughts and actions with the only purpose of doing good to other people without any evil intention or desire to deceit them, to take advantage of them, or to manipulate or control them; reviewing constantly one's performance as one struggles for congruency.
Results Orientation	Works with energy, drive and a need to finish what is started; does not give up before finishing, even in the presence of resistance or setbacks; constantly exerts pressure on himself / herself and others to achieve the results.
Client Orientation	Has desire to help or serve the clients, to respond to their needs, investing effort in identifying the needs and expectations of customers.
Responsiveness to Change	Accepts changes as positive and necessary for growth and progress both at the personal and organizational level. Identifies and drives change, facilitating the transition in the change process meanwhile helping others to cope with the effects of change.
Teamwork	Implies the purpose of working collaboratively with others, to be part of a team, to work together as opposed to working separately or competitively.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The Structure of the Dictionary

All the eight competences in the dictionary are structured in the same way, following the model presented in Figure 2.4. Each competency consists of:

a) A name.

b) A definition i.e. what is the purpose of the person who shows that competence.

c) Three development levels of the competency, with their respective names and definitions. Each level is cumulative, that is to say a behaviors from a lower level are generally prerequisites for the behaviors of a higher level.

d) Five behavioral descriptors for each level.

Name of the Competence		
Definition:		
Level 1 Name Definition	**Level 2** Name Definition	**Level 3** Name Definition
Five behavioral descriptors	Five behavioral descriptors	Five behavioral descriptors

Figure 2.4: The structure of the competences in the Leadership Competence Dictionary Alabart

The first level of the eight competences corresponds to the individual that has no formal authority. The behavioral descriptors of this level constitute a model of leadership behaviors related to "Leadership without Title", see Figure 2.5. In turn, the second level corresponds to individuals that have formal authority and refers to "Team Leadership." Finally, the third level concerns to senior management and is called "Organizational Leadership."

ISBN:978-84-693-5423-0/DL:T-1414-2010

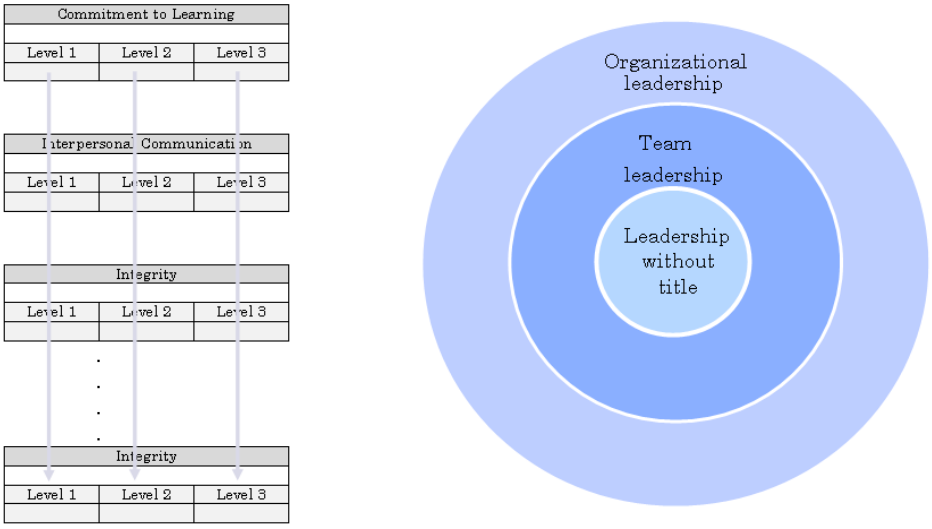


Figure 2.5: Three levels of development for each competence and three levels of leadership development

2.3.8. 360 DEGREE FEEDBACK

360 degree feedback has been used to round-out a view of each leader's performance. The concept of 360 degree feedback is fairly straightforward. It involves a number of target individual's colleagues (seniors, peers, direct reports, and even clients) providing the ratings of the target's current level of competence along a number of behavioral indicators. Figure 2.6 presents the schematic view of 360 degree feedback.

Source: http://drivenleaders.com/category/personal-development/

Figure 2.6: Schematic view of 360 degree feedback process

ISBN:978-84-693-5423-0/DL:T-1414-2010

The 360 degree feedback process used in this study has been based on the eight leadership competences defined in the leadership competence dictionary "Alabart". In the process, the behavioral descriptors from **level 2**, team leadership level, have been utilized.

The sum of the behavioral descriptors corresponding to eight competencies gives rise to a forty-statement questionnaire. Team leaders self-assessed their current leadership competence along those behavioral descriptors. Likewise, team members rated their team leaders against the same set of behavioral descriptors.

The behavioral items in the questionnaire have been rated on a 5 point "rating scale" which goes from "1" (not developed) to "5" (excellent) with the inclusion of a "I can not evaluate" response. A sample survey statement is "Keeps promises made to other people". The detailed explanations of the implementation of 360 degree feedback process to the PMP course is described elsewhere (Özgen *et al.*, 2008b)[7].

The internal consistency coefficients (alpha) for each competence scale and overall scale have been calculated and are presented in Table 2.16. Based on members' responses the alpha coefficients for the competence scales ranged from 0.65 to 0.85 and the overall scale reliability was 0.955.

Table 2.16: Alpha coefficients for the leadership competence scales by respondent type

Competences	Alpha coefficient Respondent Type	
	Team Member	Team Leader
Commitment to Learning	0.77	0.55
Interpersonal Communication	0.71	0.66
Drive for Excellence	0.77	0.80
Integrity	0.66	0.84
Results Orientation	0.77	0.84
Client Orientation	0.85	0.79
Responsiveness to Change	0.78	0.66
Teamwork	0.65	0.66
Overall Scale	0.955	0.962

[7] This article can be found in Appendix 2.4

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

2.3.9. TEAM CLIMATE SURVEY

A survey has been used to measure the climate in the team. The survey statements have been designed to capture the key climate aspects at the team level in project teams. As it was expected that a long questionnaire would discourage the respondents (Renssen and Nieuwenbroek, 1997), the number of survey items has been limited so that it took no more than 15-20 minutes to complete.

The survey consisted of 22 items (See Appendix 3.3). Responses were given on a Likert-type scale ranging from "1" (totally disagree) to "6" (totally agree). A sample survey item is: "I trust the rest of the team members." In addition to these items, the survey also included two open-ended questions to obtain additional information about members' perspectives regarding the project.

The Cronbach's alpha coefficient of reliability has been calculated for a sample of 46 project teams (221 team members) and alpha coefficient of 0.88 has been found which is higher than the suggested value of 0.70 (Nunnally and Bernstein, 1994). These results indicate that acceptable levels of internal consistency have been achieved for the climate survey.

2.3.10. FOCUS GROUP

Focus groups have been conducted with the first year team members to solicit their opinion regarding their respective team leaders. A focus group is a discussion in which small a group of participants, guided, by a facilitator, talk openly and spontaneously about themes relevant to the research (Krueger and Casey, 2000). Focus groups sessions use open ended questions to initiate the group's opinions, perceptions, and reactions toward specific issues.

The focus groups questions asked to the members were about their team leaders. A sample focus group question was: "How do you feel when you interact with your team leader?" The procedure used in the focus group is presented in Appendix 3.4.

ISBN:978-84-693-5423-0/DL:T-1414-2010

All the focus groups have been recorded audibly and visually and were transcribed into a Word document.

2.4. CODIFICATION PROCESS

The leader students' learning journals and BEIs have been codified against the leadership competence dictionary "Alabart" to identify the leadership behaviors shown by the leader students. The codification process followed in this study is outlined in Figure 2.7 and each step in this process is described in the following.

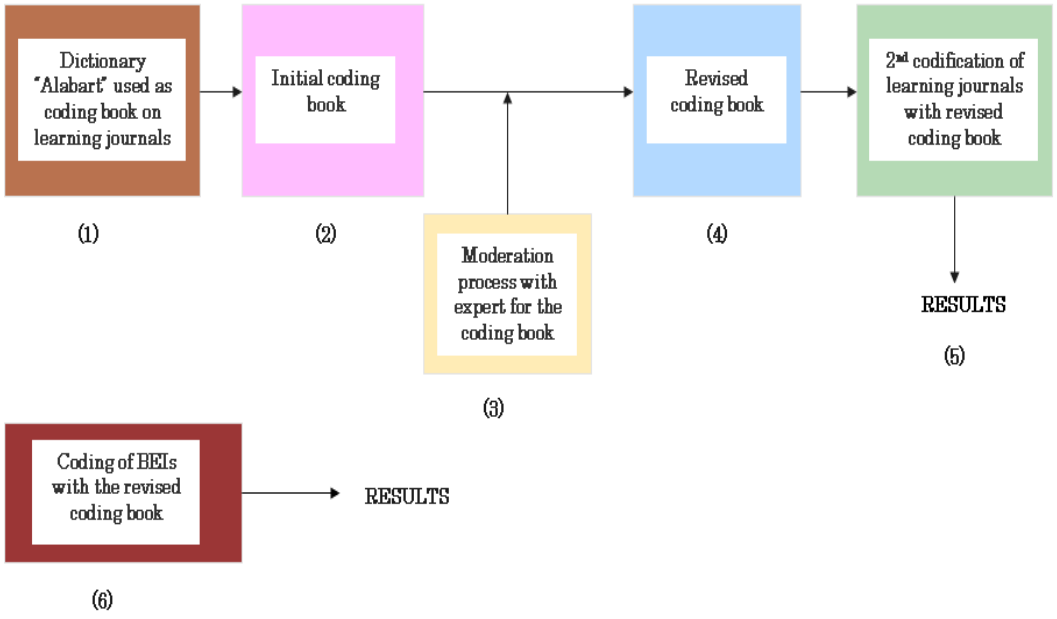


Figure 2.7: The coding process for the learning journals and the BEIs for the identification of the leadership behaviors

Step 1 (Coding journals with the competence dictionary "Alabart")

The codification started with the learning journals as those seemed to contain more diverse leadership behaviors than the behavioral event interviews. Initially, leadership competence dictionary "Alabart" (Alabart *et al.*, 2008c) has

ISBN:978-84-693-5423-0/DL:T-1414-2010

served the basis to code the leadership behaviors with the 120 leadership behaviors[8] outlined in this dictionary.

Step 2 (Initial coding book)

Codification has not been limited only to the behavioral descriptors described in the competence dictionary. Other effective leadership behaviors, as appeared in the journals, have been codified to develop a more detailed **coding book**[9].

All the behaviors identified apart from the dictionary have been examined to see how they fitted to the dictionary. Those behaviors that shared a similar motivation with a behavioral indicator in the dictionary have been grouped under that indicator. For example, the behavior "states balance of consequences" has been grouped under the indicator of "confronts people with performance problems."

Those behaviors that could be an additional indicator of a competence have been added as such as. To give an example, the behavior "manages performance" has been added to the coding book as a behavioral indicator for the "results orientation" competence at level 2.

Step 3 (Moderation process)

Once those additional behaviors have been placed in the coding book, revisions were made with a field expert to check the consistencies of the behaviors. Necessary changes have been made where necessary.

Step 4 (Revised code book)

After the moderation process, the revised code book has been developed.

Step 5 (Second coding with the revised coding book)

The journals have been coded for the second time with this revised coding book. Please refer to Appendix 3.5 and 3.6 to see the final version of the coding book used in the present study.

[8] (5 descriptors * 8 competences * 3 levels = 120 effective leadership behaviors)
[9] Coding book is normally the total set of codes in a given piece of research (Joffe and Yardley, 2003)

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Step 6 (Coding of BEIs with the revised coding book)

All the behavioral event interviews have been coded against the revised coding process and coded by a graduate student who received one-month training on coding the leadership behaviors with the revised coding book.

Manual Coding

All the journals and the BEIs have been coded manually by assigning **three digit numbers** to each one of the behavioral indicators in the revised coding book. The hundreds digit represents the competence that the behavior belongs to (e.g. 1=commitment to learning, 2=interpersonal communication, etc.). Tens digit shows the proficiency level of the behavior (1=level one, 2=level two, 3=level three). Finally, the units digit demonstrates the behavioral descriptor. Figure 2.8 presents an example for such codification.

In the example given in Figure 2.8, the behavior has been coded as 524; meaning that the behavior shown by the student was a behavior from the "results orientation" competence at "level 2" as identified by the "4th behavioral descriptor" in the dictionary.

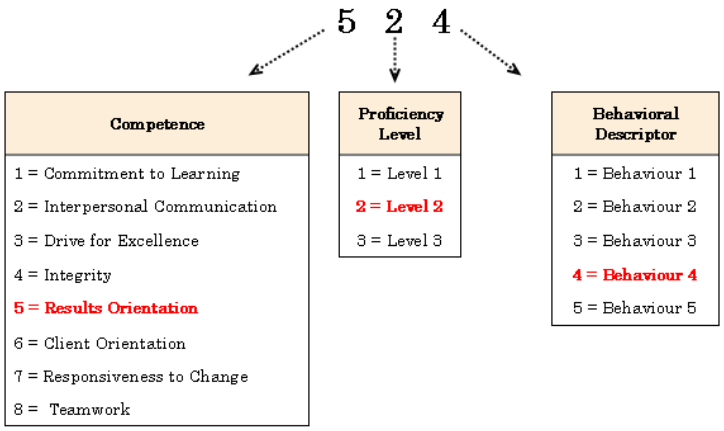


Figure 2.8: Example demonstrating the use of three-digit numbers used to codify the leadership behaviors by competence, proficiency level, and the behavioral descriptor

A sample section from a learning journal codified manually is presented in Figure 2.9. The leader made this entry in March and this was his/her 25th entry to the journal. As can be seen in Figure 2.9, each time an effective

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

leadership appeared in the learning journal, it was codified with the numeric code assigned to that behavioral descriptor.

Date of Entry:	23.03.2008
Number of Entry:	25

	Competency	Code	Indicator	N.
Today, I tried to make them (members) feel that the time was finishing and there was still too much left to finish in the project……	Results Orientation	522	Conveys a sense of urge to finish the work	145
…. I have transmitted my satisfaction with the format, content, and the correction of the report. I gave my opinion and I congratulated him.	Teamwork	825	Gives recognition	146
…….and I asked them one question "if you are engineers and if you want to construct this plant, you would be interested in studying the reactions. Why?"	Commitment to L.	124	Asks insightful questions	147

Figure 2.9: Example section from a learning journal codified manually against effective leadership behaviors

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

2.5. DATA COLLECTION & MEASUREMENT OF STUDY VARIABLES

This section presents the data collection and measurement of study variables.

2.5.1. DATA COLLECTION

The data collection carried out with the research tools are summarized in Table 2.17. All four **personal tests** (BSPI, MSQ, MBTI, and SVS) have been administered to all the PMP students ($N_T = 63$) from two consecutive academic years (2007-2008 and 2008-2009).

The three tests (BSPI, MSQ, and MBTI) have been applied in September and one test (SVS) in November. The BSPI have been also administered to the members of the 24 project teams formed in two consecutive academic years.

Learning journals of eleven leader students from 2007-2008 academic year have been utilized in this study. Permissions have been requested from the leader students to have access to their journals in the beginning of academic year when the PMP class started. Students have been informed that the findings from the analyses of their journals and would form part of this doctoral thesis and might also be published as a research article. Once the academic year finished, in June 2008, journals have been collected. Of the eleven leaders, six of them kept their learning journals in electronic format and five of them in the notebook format.

The electronic journals have been directly downloaded from university's virtual campus where they were kept. For the journals in notebook format, the leader students have been contacted (by phone or email) to have a photocopy of their learning journals. In one case, it was not possible to obtain the notebook as the leader was out of country. Therefore, with the permission of the student, the copy of the journal was attained from student's tutor. All journals in notebook format were transcribed into word document.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.17: Data collection

Tool		Collected from	Sample Size	Collection Time		
				Semester	Month	Academic year
Belbin self perception inventory	(BSPI)	PMP students	63 [a]	1st	September	2007-2008 and 2008-2009
		Project teams	24 [b]	1st	September	2007-2008 and 2008-2009
Managerial style questionnaire	(MSQ)	PMP students	63	1st	September	2007-2008 and 2008-2009
Myers-Briggs type indicator	(MBTI)	PMP students	63	1st	September	2007-2008 and 2008-2009
Schwartz value survey	(SVS)	PMP students	63	1st	November	2007-2008 and 2008-2009
Learning journal		Leader students	11	1st	June	2007-2008
Behavioral event interview		Leader students	11	1st	April	2007-2008
360 degree feedback		Leader students	11	1st	February	2007-2008
		Team members	53			
Leadership learning		Leader students	24	2nd	July	2007-2008 and 2008-2009
Team performance		Team members	23	2nd	June	2007-2008 and 2008-2009
Team climate		Leader students		1st	December	2007-2008
		Team members		2nd	May	
Focus group		Team members		2nd	April	2007-2008

Note: "a" = The number of PMP students was 30 in the 2007-2008 academic year and 33 in the 2008-2009 academic year, "b" From 24 project teams a total of 143 participants responded the questionnaire (24 team leaders and 119 team members

ISBN:978-84-693-5423-0/DL:T-1414-2010

Behavioral event interviews have been conducted with the eleven leader students from 2007-2008 academic year. These interviews have been conducted by three PMP course instructors during April 2008. The dates and the interviewers for the BEIs are displayed in Table 2.18.

Table 2.18: The dates and the interviewers of the BEIs conducted with the eleven leader students from 2007-2008 academic year

Leader Student	Date of the Interview	Interviewer
L1	01.04.2008	Joan Ramon Alabart
L2	27.04.2008	Sibel Özgen
L3	23.04.2008	Joan Ramon Alabart
L4	30.04.2008	Sibel Özgen
L5	24.04.2008	Joan Ramon Alabart
L6	17.04.2008	Joan Ramon Alabart
L7	23.04.2008	Sibel Özgen
L8	30.04.2008	Magda Medir
L9	21.04.2008	Sibel Özgen
L10	07.04.2008	Joan Ramon Alabart
L11	29.04.2008	Sibel Özgen

360 degree feedback process has been applied to the eleven leaders from 2007-2008 academic year and to their respective team members. The application took place in February allowing the first year students to have had observations on their team leaders for at least four months as suggested by the literature (Conger and Toegel, 2003). This application has been automated by the means of a web-based application (Boonsai®). One week prior to the application, a 360 degree feedback training program was held in university's congress hall. Students were trained on: objective of the process, understanding of the competencies and the rating scale, and using the online questionnaire. The objective of the process has been made explicit by clarifying that the process was implemented (a) to assist leader students in their development of leadership competence, and (b) *not* to use it as evaluation criteria for their final grade. In the training, explanations have been provided on the definitions of the competencies against which leaders' performance would be assessed. Information has been provided about how to access the web-application and how

ISBN:978-84-693-5423-0/DL:T-1414-2010

to complete the survey on-line. Ground rules governing the issues of *confidentiality* and *anonymity* have been also communicated. It has been ascertained that all individual responses would be kept confidential and would be stored in an electronic database. Students have been informed that the scores would be averaged across all members of a team to protect the rater anonymity. The week following the training, invitation emails have been sent to students to inform that they can access and complete the survey questionnaire. The emails included the information about the URL link to the survey, the password and username required to access the survey. After a period of two weeks reminder emails have been sent to the students. The number of respondents for each team leader in the 360 degree feedback process is shown in Table 2.19.

Table 2.19: Number of respondents (team members) for each team leader in 360 degree feedback process

Leader Code	Number of respondents
1	6
2	6
3	5
4	3
5	5
6	6
7	4
8	5
9	6
10	5
11	2
Total	53

Leadership learning for the leader students has been measured as their final PMP grades and those grades have been collected in July when the academic year has finished. The calculation of leadership learning (PMP grades) is detailed in Section 2.5.2.5.

Team performance has been measured as the grades of the integrated-design projects. To obtain those grades, students have been contacted by email

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

and phone in June. The calculation of the team performance is detailed in Section 2.5.2.6.

Team climate survey has been administered to the members of the team at two times during the academic semester (in December for the 1st semester, in May for the 2nd semester). Team members have been approached during their weekly team meetings and the survey has been handed in the beginning and collected at the end of the team meetings. All questionnaires have been completed anonymously and respondents (members) have been assured of the confidentiality of their responses. The distribution and the collection of the survey have been done by a team of fourth year student project team (called monitoring team) under my supervision.

Focus groups have been conducted with the members of the team leaders from 2007-2008 academic year. For this purpose, meeting rooms have been reserved. Members have been assured of the confidentiality of their information. The focus groups have been audibly and visually recorded by the digital cameras. Focus groups have been conducted by the members of fourth year student project team (called monitoring team) under my supervision

2.5.2. MEASUREMENT OF VARIABLES

This subsection describes how the following variables have been measured in the current study:

Sample characteristics	Determined by the four tests BSPI, MSQ, MBTI, and SVS.
Critical events encountered by the leader students	Identified by the behavioral event interviews.
Number and diversity of leadership behaviors	Coded in the leader students' learning journals and BEIs
Members' perception of leadership effectiveness	Determined by 360 degree feedback ratings.
Leadership learning	Identified by the final PMP course grades.
Team performance	Identified by the integrated design project grades.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

2.5.2.1. SAMPLE CHARACTERISTICS

The analyses for the sample characteristics have been carried out for all the PMP students and the selected leader students.

Sample Characteristics for all the PMP Students

For the PMP students, the following characteristics have been analyzed: gender, academic eligibility, motivation to lead, and personality profile:

Gender		
Academic eligibility		
Motivation to lead		
Personality profile:	Team role preferences	measured by BSPI
	Managerial styles	Measured by MSQ
	MBTI types	Measured by MBTI
	Value types	Measured by SVS

Team Role Preferences

PMP students' team role preferences have been measured in two ways:

1) Primary role preferences
2) Mean role scores for the sample

Primary team role has been identified as the role that has the highest score among the eight team roles. In several cases, however, students' highest scores fell on more than one team role; making it not possible to appoint only one primary role for these students. To distinguish such students, the term "mixed" has been used in this dissertation.

Mean scores for each team role has been calculated for the PMP students. An example for the calculation of mean role scores is shown in Table 2.20.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.20: Example calculation for the mean role scores for a 10 student sample

Student	IMP	CO	SH	PL	RI	ME	TW	CF
S1	11	2	13	11	4	6	3	20
S2	6	17	16	2	1	14	7	7
S3	17	19	9	4	4	12	2	3
S4	16	11	12	2	5	6	10	8
S5	13	11	13	3	5	4	9	12
S6	14	8	23	3	4	3	5	10
S7	17	15	9	6	5	2	4	12
S8	2	11	22	0	5	15	5	10
S9	2	6	16	27	8	8	3	0
S10	10	11	11	8	8	10	5	7
Mean	10.8	11.1	14.4	6.6	4.9	8.0	5.3	8.9

Note: "IMP" = Implementer, "CO" = Coordinator, "SH" = Shaper, "PL" = Plant, "RI" = Resource investigator, "ME" = Monitor evaluator, "TW" = Teamworker, "CF" = Completer finisher

Managerial Styles

PMP students' managerial styles have been measured in two ways:

1) Perceived managerial style
2) Mean managerial scores for the sample

Perceived managerial style has been identified as the style that has the highest percentile score among the six managerial styles. In several cases, however, students' highest percentile score fell on more than one managerial; making it not possible to appoint only one style for these students. To distinguish such students, the term "mixed" has been used in this dissertation.

Mean scores for each managerial style has been calculated for the PMP students based on the students' raw scores. An example for the calculation of mean managerial scores is shown in Table 2.21.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.21: Example calculation for the mean managerial style score for a 10 student sample based on raw scores

Student	COE	AUT	AFF	DEM	PCS	COA
S1	2	11	4	7	7	5
S2	3	8	4	9	6	6
S3	4	8	3	8	3	10
S4	8	8	6	5	2	7
S5	4	8	5	5	5	9
S6	5	10	4	6	6	5
S7	4	10	4	6	5	7
S8	1	5	7	10	6	7
S9	7	6	8	7	4	4
S10	7	7	6	5	5	6
Mean	4.5	8.1	5.1	6.8	4.9	6.6

Note: "COE" = Coercive, "AUT" = Authoritative, "AFF" = Affiliative, "DEM" = Democratic, "PCS" = Pacesetting, "COA" = Coaching

MBTI Types

PMP students' MBTI types have been measured in two ways:

1) MBTI types (e.g. ESTJ, INTP, ISTJ, etc)

2) Percentage of MBTI preferences

The second one has been shown as the percentage of students in four preference pairs. See the example given in Table 2.22.

Table 2.22: Calculation of the percentage number students in four preference pairs

Student	EI	SN	TF	JP
S1	E	S	T	J
S2	E	S	T	P
S3	E	S	F	J
S4	I	S	T	J
S5	E	S	T	P
S6	E	S	T	J
S7	I	N	T	J
S8	I	N	T	P
S9	E	N	F	J
S10	I	S	T	J
%	60% E: 40% I	70% S: 30% N	80% T: 20% F	70% J: 30%P

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Value Types

PMP students' value types have been measured by calculating the means for each ten value type. Later, those means for the ten values have been rank ordered. See the example given in Table 2.23.

Table 2.23: Calculation of the mean value scores for a 10 student sample

Student	SD	UN	BE	CO	TR	PW	SE	AC	HE	ST
S1	3.80	4.13	6.00	5.75	4.60	2.25	4.40	2.50	5.00	5.00
S2	4.60	4.25	5.20	4.00	0.60	1.25	3.40	4.75	4.67	4.33
S3	3.60	2.50	5.00	4.75	3.00	1.25	3.40	3.25	2.33	3.00
S4	4.40	4.25	4.40	5.50	1.80	0.75	5.40	3.00	5.00	4.33
S5	5.00	5.25	5.00	5.25	3.20	1.00	4.40	3.50	4.67	5.33
S6	5.00	3.88	4.40	5.00	3.80	4.50	4.40	4.50	5.00	3.67
S7	4.40	4.38	4.80	5.25	3.60	3.75	4.00	5.00	4.67	5.67
S8	4.60	4.00	5.20	4.00	1.80	2.00	2.40	3.00	2.33	3.33
S9	3.00	2.63	4.60	5.75	2.60	1.50	5.00	2.00	3.33	3.00
S10	4.40	2.88	5.60	2.50	2.80	2.00	1.80	3.75	4.67	2.67
Mean	4.28	3.81	5.02	4.78	2.78	2.03	3.86	3.53	4.17	4.03
Rank order	BE > CO > SD > HE > ST> SE > UN > AC > TR > PW									

Note: "SD" = Self-direction, "UN" = Universalism, "BE" = Benevolence, "CO" = Conformity, "TR" = Tradition, "PW" = Power, "AC" = Achievement, "HE" = Hedonism, "ST" = Stimulation

Sample Characteristics of the Leader Students

Sample characteristics of the leader students have been identified as their primary role preferences, managerial styles, MBTI types, and high priority values. The identification of those profiles has been explained above and will not be repeated here.

In addition to those, for the statistical analyses leader students' continuous MBTI scores and scores on higher order value types have been calculated. Explanations are provided below.

The scores on the MBTI have been converted to "continuous scores" by setting midpoint is at 100. Preference scores for E, S, T, and J are subtracted from 100 while preference scores for I, N, F, and P are added to 100 (Myers and McCaulley, 1998). For example, the individual shown in Table 2.24 has a preference for introversion "I 41" and therefore the continuous score on the E-I scale is 141 (100+ 41 = 141).

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.24: Example demonstrating the individuals' pair preferences

	EI Scale	SN Scale	TF Scale	JP Scale
Score on the scale	41 **(I)**	15 **(S)**	49 **(T)**	43 **(J)**
Continuous score	141	85	51	57

Higher order value types have been calculated as the mean of the values in each higher order value type. In this step, the scores have been corrected for scale use as suggested by Schwartz (1992).

2.5.2.2. CRITICAL EVENTS ENCOUNTERED

The critical events explained by the leader students (11 leaders from 2007-2008 academic year) in their BEIs have been content analyzed and grouped according to the:

(a) academic semester they occurred,

(b) type of people involved (e.g. members, professors, etc.),

(c) type of the event (e.g. lack of member motivation, member underperformance).

2.5.2.3. MEMBER PERCEPTION OF LEADERSHIP EFFECTIVENESS

Member perception of leadership effectiveness have been identified by the members' rating of the leader students effectiveness on the eight leadership competences of the competence dictionary "Alabart" as measured in the 360 degree feedback.

In this study, team members have been selected as the feedback providers as *follower perceptions* are claimed to be the most meaningful measure of leader behavior (Atwater & Yammarino, 1992). The member ratings have been averaged across eight leadership competences to yield an overall leadership rating; members' perception of leadership effectiveness.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

2.5.2.4. NUMBER AND DIVERSITY OF LEADERSHIP BEHAVIORS

The number and diversity of the leadership behaviors shown by the leader students have been identified by coding of the learning journals and the BEIs of the eleven leader journals from 2007-2008 academic year.

An example of the behaviors codified together with the competence to which they belong, their proficiency levels and the frequencies is shown in Table 2.25.

Table 2.25: An example demonstrating the results from a leader's codified journal/BEI

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Shares the knowledge and experience with others	1
	Client Orientation		2	Responds adequately to clients' questions, requests, and complaints	1
	Total in Level 1				**2**
Level 2	Commitment to Learning		1	Provides a balanced view of members' strengths and weaknesses	2
			2	Facilitates the others learn to solve the problems on their own	1
			3	Provides timely and constructive feedback	1
			4	Is committed to enlisting support for others	1
		Total			**5**
	Teamwork		5	Creates an atmosphere of mutual trust and respect	5
			6	Assesses and selects appropriate approach to lead	2
			7	Demonstrates caring leadership	2
			8	Promotes communication in the team	1
		Total			**10**
	Interpersonal Communication		9	Understands others underlying needs, interests, problems and motivations	4
			10	Convince others appealing to their interests	1
		Total			**5**
	Total in Level 2				**20**
Level 3	Responsiveness to Change		1	Is accessible to the others	**1**
Total					**23**

ISBN:978-84-693-5423-0/DL:T-1414-2010

Based on the data provided above the number and diversity of the leadership behaviors identified in this students journal and BEI are shown in Table 2.26. The total number of behaviors has been calculated as the total frequency.

Table 2.26: Example demonstrating the identification of number and leadership behaviors in a learning journal (or BEI)

Proficiency level	Number of behaviors	Diversity of behaviors
Level 1	2	2
Level 2	20	10
Level 3	1	1
Total	23	13

It can be seen that a total of 23 behaviors have been identified two of them were from level 1, twenty from level 2, and one from level 3.

The diversity of the behaviors has been identified as the number of different behavioral descriptors identified. It can be observed that a total of 13 different leadership behavioral descriptors have been coded and two of them were from level 1, ten from level 2, and one of them from level 3.

2.5.2.5. LEADERSHIP LEARNING

The final grade obtained by the leader students in the PMP course has been associated to the leadership learning. The leader students have been graded in the PMP course with different assessment tools. Those tools together with their percentage contribution to the final PMP course grade are displayed in Table 2.27.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.27: The assessment of the leader students' grade in the PMP course

Assessment components		Percent of the leaders' final PMP grade (%)	
		2007-2008	2008-2009
Team Charter	1st semester	8	10
	2nd semester	12	
Final Report	1st semester	6	10
	2nd semester	9	
Oral Presentation	1st semester	12	15
	2nd semester	18	
Exam		25	35
Personal Development Plan		5	-
Learning Journal		5	10
Assessment of the tutor			20

Team Charter is the first project management report that is required from the team leaders (Bens, 2001). This report embodies the foundations of the team in its forming stage and the planning of the project and it is co-created by the team leader and his/her team members. The content of the Team Charter is presented in Table 2.28.

Final Reports are written by the team leader students at the end of both academic semesters (Martin and Tate, 1997). For this purpose, leader students hold a meeting with their teams to perform a review and evaluation of the semester just finished. The content of the Final Reports is presented in Table 2.29. The first section of the report, project management, deals with the characteristic review issues when managing a project, thus must give answer to questions such as: What was really created versus what was planned? Were there deviations from the project scheduling? Why did the deviations occur? Could they have been avoided? etc.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.28: Content of the Team Charter

1.The project team
Roster
Talent inventory
Roles description
Team norms
Lessons learned and recommendations for improvement
2.Project scope
Project clients (needs and requirements)
Project products
Project objectives
Work Breakdown structure
3.Project schedule (Gantt chart)
4.Meeting management
5.Stakeholders communication strategy
6.Attachments

Table 2.29: Content of the Final Report

1.Project Management
Project scope
Schedule
Staff time
Additional issues: new members, and/or drop outs, conflicts, etc.
2.Evaluation
First-year instructors' satisfaction
Team performance
Individual member performance
Team leader performance
Lessons learned and recommendations for improvement
3.Strengths and recommendations for improvement for the PMP course and the IDP
4.Attachments

ISBN:978-84-693-5423-0/DL:T-1414-2010

The second section of the Final Report involves a thorough evaluation of the project team at different levels. Team members, with the help of their team leader, analyze the individual grades and feedback received from first-year instructors. Team leaders also meet with first-year instructors to discuss with them their grading of first-year students and to solicit their feedback about the functioning of the project teams. Team leaders carry out individual performance evaluation meetings with their team members and share the main results of these individual evaluations with the whole team and first-year instructors. In addition to a grade, team leaders provide team members with a summary of strengths and areas of improvement. The latter will form part of the lessons learned and recommendations for improvement subsection. In addition, team leaders must also review and reflect on their own performance by reviewing their learning journals, the feedback received from their coaches throughout the period, and to solicit feedback from their team members (for example through a needs & offers feedback exercise). The last section of the Final Report compiles the strengths and recommendations for improvement for the PMP course and the first-year integrated project.

The other component assesses in the PMP course is the **oral presentations**. The leader students are required to prepare and deliver a ten-minute oral presentation based on their Final Report that are handed one week prior to the presentation. The presentation is followed by a five-minute question-and-answer period.

The **personal development plan**, used in the 2007-2008 academic year, asked the leader students to identify their strengths and areas of improvement in relationship to leadership competences or behaviors and they were asked to identify the specific actions they would take to improve their areas needed improvement.

The **PMP exam** consists of 50 multi-choice questions about the leadership, facilitation, and team management topics covered in class.

The **learning journals** are evaluated based on the periodicity and the content of the entries. For the grading of the learning journals, a rubric is used and it is presented in Table 2.30.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.30: The rubric for grading the learning journals

Variable	Unsatisfactory "0"	Acceptable 5	Excellent 10
Periodicity (25%)	Does not make periodic entries.	Makes entries in a periodic manner.	Makes entries in a periodic manner.
	Makes less than 3 entries per month.	Makes one entry per week.	Makes 2 or more entries per week.
Variable	Unsatisfactory "0 to 3.5"	Acceptable "3.6 to 6.9"	Excellent "7 to 10"
Content (75%)	Describes only the facts.	Describes the key events, meetings and other aspects of work related to PMP.	Reaches level 2 and also reflects on his/her role and about competences developed.
	Does not describe any critical event. Describes irrelevant facts. Have significant gaps.	Thinks about the events, actions, thoughts, opinions and feelings (what s/he thought about the people involved, or the situation).	
	The coach can not draw conclusions to give feedback for the development of competences.	The coach can draw conclusions to give feedback for the development of competences.	The coach can draw conclusions to give a good feedback for the development of competences.

2.5.2.6. TEAM PERFORMANCE

The performance of the IDP teams has been measured as the average of the individual members' final project grade. The assessment of final project grade consisted of a project planning report, a poster, a close-out report, interviews with team members, the leaders' assessment of team members' social competences, and members' peer assessment (Table 2.31). As can be seen in Table 2.20, the project planning report (PPR), close-out report (CR), and poster presentation (PP) were prepared by the team. All the members of a team, therefore, received the same grade on these components. On the other hand, the members received individual grades on the interviews (IIM), leader assessment (LA), and peer assessment factor (PAF).

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.31: Components of integrated-design project and their percentage contribution to the members' final project grade

Project Component	Abbreviation	Percent of the members' final project grade (%)	Grade given to
Project planning report	(PPR)	10	Team
Close-out report	(CR)	30	Team
Poster presentation	(PP)	20	Team
Individual interviews with members	(IIM)	25	Individual
Leader's assessment of members' social competences	(LA)	15	Individual
Peer Assessment factor	(PAF)	Used as a multiplication factor	Individual

The calculation of a team member's final project grade is shown in the equation provided below. Team performance was calculated by simply averaging the final project grades of the team members.Members' final project grade is calculated by the following equation:

$$\left(\left[\left(PPR*0.10\right)+\left(CR*0.30\right)+\left(PP*0.20\right)+\left(LA*0.15\right)\right]*PAF\right)+IIM*0.25$$

Project planning report (PPR) contributed to the 10 percent of the final project grade. These reports were graded by the project planning and the Gantt diagram (40%), statement of project objectives (20%), organization of the report (10%), team norms (10%), grammar and orthography (10%), information regarding the process (5%), and bibliography (5%).

Close-out reports (CR) constituted 30 percent of the final project grade and were assessed by the structure and the validity of the content (75%), format of the report (10%), bibliography (10%) and grammar and orthography (5%).

The poster (PP) counted about 20 percent of the final grade. Posters were graded by project clients (first-year course professors) and were assessed by the validity and order of the content (65%), visual quality (25%), and grammar and orthography (10%).

ISBN:978-84-693-5423-0/DL:T-1414-2010

During the poster sessions, project clients conducted individual interviews (IIM) with the team members. Each team member was asked to respond to a question regarding the project. The grade of the interview constituted 25 percent of the members' final grade.

The leaders' assessment (LA) accounted for 15 percent of the members' final grade and was based on the members' development of social competences (e.g. teamwork).

Peer assessment consisted of team members rating each other's and their own contribution to the team work using clearly understood criteria. The peer assessment factor (PAF) is calculated for each team member by dividing his or her grade (which is the average of the grades given to him or her by the other members) by the grade resulting of averaging all the grades of all team members in the cross evaluation. This peer assessment is incorporated to final grade by multiplying it with the base mark times the peer assessment factor (PAF) (see the equation above).

2.5.2.7. TEAM BALANCE

Belbin's team role theory received much attention with his powerful claim that *balanced teams* (i.e. those have a spread of team roles) have a higher propensity to perform better than *unbalanced teams*. Though the theory is appealing, Belbin has provided little information on the measurement of team balance. This lack of clarity in defining and measuring team balance led researchers to formulate quantitative measures of balance based on Belbin's qualitative definitions. This study uses the four balance measures from literature:

- Belbin's basic concept (1981)
- Senior's Measure (1997)
- Won-Woo and Hojin's Measure (2002)
- Partington & Harris's Measure (1999)

Team balance measures stated above, rely on the assumption that the balance within a team is achieved when all team roles are represented in the profiles of members, at least, at a "certain level", e.g. highest scoring role level (Belbin, 1981), natural role level (Senior, 1997; Won-Woo, 2002), high or very high scoring role level (Partington and Harris, 1999). These studies have been

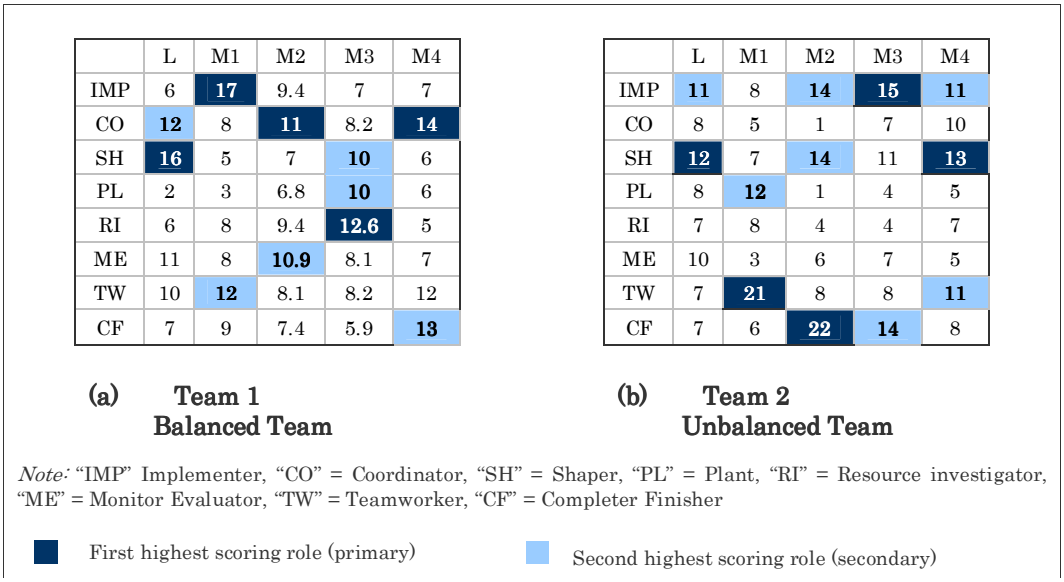
ISBN:978-84-693-5423-0/DL:T-1414-2010

later criticized by Van de Water *et al.* (2007) for not taking into account the notion of suitability of role pair combinations. This study takes into account Fisher's task-relationship construct and investigates the effect of members' interaction type on team performance.

These five different balance measures that have been used in the present study are explained below.

Belbin's Basic Concept (1981)

This concept suggests that for a team to be balanced each team role should be represented in at least one team member's profile as the first or second highest scoring role. Figure 2.10 depicts an example for the identification of team balance according to the Belbin's basic concept.



	L	M1	M2	M3	M4
IMP	6	**17**	9.4	7	7
CO	**12**	8	**11**	8.2	**14**
SH	**16**	5	7	**10**	6
PL	2	3	6.8	**10**	6
RI	6	8	9.4	**12.6**	5
ME	11	8	**10.9**	8.1	7
TW	10	**12**	8.1	8.2	12
CF	7	9	7.4	5.9	**13**

(a) Team 1 Balanced Team

	L	M1	M2	M3	M4
IMP	**11**	8	**14**	**15**	**11**
CO	8	5	1	7	10
SH	**12**	7	**14**	11	**13**
PL	8	**12**	1	4	5
RI	7	8	4	4	7
ME	10	3	6	7	5
TW	7	**21**	8	8	**11**
CF	7	6	**22**	**14**	8

(b) Team 2 Unbalanced Team

Note: "IMP" Implementer, "CO" = Coordinator, "SH" = Shaper, "PL" = Plant, "RI" = Resource investigator, "ME" = Monitor Evaluator, "TW" = Teamworker, "CF" = Completer Finisher

First highest scoring role (primary)

Second highest scoring role (secondary)

Figure 2.10: Example identification of team balance based on Belbin's basic concept

Member profiles in Team 1, collectively, have all eight team roles represented as the first or second highest scoring role. In Team 2, on the other hand, "resource investigator" and "monitor evaluator" roles are unrepresented. According to the Belbin's definition team 1 can be regarded as a balanced team whereas team 2 can be considered as an unbalanced team. For the purposes of this study, project teams were categorized into two categories of balance: (a) balanced and (b) unbalanced teams. See Appendix 3.7 for the categorization of

project teams. Balanced teams have been codified as "1"and unbalanced teams codified as "0".

Senior's Modified Measure (1997)

In her study, Senior (1997) used Belbin Associates' Interplace computer programme to determine the team roles. This programme, which is available only commercially, differs from the original eight-role version of Self-Perception Inventory (SPI) by several means. First of all, Interplace© includes the ninth team role, the "specialist" and secondly, it brings about the observation from others in addition to self-evaluation (Senior, 1998; Hartley, 1997). There is no information available as to how the Interplace© program scores different instruments (Senior, 1998); however, it is known that for SPI the programme calculates and norms the individual profile against a large data bank (over 5600 SPI's)[10] and gives a score between 0 and 100 on each of the nine roles.

As this study utilized the SPI and as it was not possible to access Belbin® NORM database, norms for the present study were calculated using the SPIs of 143 students from the 24 project teams[11]. SPSS 17 was used for the calculations. Firstly, standard scores were computed for the eight team roles (analyze→ descriptive statistics→ save standardized values as variable) to be later utilized in the calculation of percentile ranks (transform→ compute → numeric expression [CDFNORM (standard scores)*100]).

Senior's measure extends Belbin's basic concept by formulating team balance as the combination of the following two measures (Senior, 1997; Senior, 1998):

(1) Each team role should be represented at a *natural level* which is presumably indicated by a score of least 70 points.
(2) The average team role scores should not vary more than 20 %.

The formulation of "20 % variation" in the second statement has been later criticized by Van der Water *et al.* (2007) arguing that "*…20 percent must be 20 points instead of percentage otherwise this constraint is multi-*

[10] Information retrieved from the online document published at the official Belbin web-site http://www.belbin.com/content/page/3028/Belbin%20sample%20Self-Perception%20report.pdf

[11] Please note that, in this case all members from the 24 teams are used to have a larger data base

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

interpretable" (Van der Water *et al.*, 2007: p.889). Therefore, this study follows the definition of Van der Water *et al.* (2007). Figure 2.11 below demonstrates identification of team balance according to Senior's two measures of balance.

	L	M1	M2	M3	M4
IMP	9.29	**95.47**	34.78	14.71	14.71
CO	**86.71**	53.21	**80.37**	55.25	**94.84**
SH	**90.19**	18.74	31.17	54.11	24.53
PL	12.17	17.12	45.07	**71.61**	38.30
RI	34.28	59.73	**75.87**	**95.94**	23.26
ME	**72.14**	43.06	**71.28**	44.06	33.41
TW	54.96	**72.71**	37.04	37.95	**72.71**
CF	31.02	48.07	34.24	22.92	**80.12**

(a) First Measure Normalized Scores

	Average Team Scores	Variation
IMP	33.79	
CO	74.08	
SH	43.75	
PL	36.85	40.28
RI	57.82	
ME	52.79	
TW	55.07	
CF	43.27	

(b) Second Measure Variation

Natural roles (roles scoring at or above 70 points) are highlighted in bold characters

Variation = Highest Average Score- Smallest Average Score

Figure 2.11: Example identification of team balance based on Senior's measures

On the left hand side of Figure 2.11 are shown the normalized team role scores of Team 1 which has been presented earlier in Figure 2.10. It can be easily seen that all eight team roles are fully represented at or above natural role level (score of 70 or above), thus fulfilling the requirements of Senior's first measure of balance.

The right hand side of Figure 2.11 shows the variation between the average team role scores. The difference between the highest and lowest scoring roles was 40.28 points (74.08 - 33.79); exceeding the 20 points criterion set for a balanced team by the second measure of Senior (1997).

In a similar fashion as shown above, the balance of the 18 teams that took part in the current study was identified using Senior's algorithm (please refer to Appendix 3.8 and 3.9 for Senior's first and second measure of balance respectively).

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Won-Woo and Hojin's Measure (2002)

Won-Woo and Hojin (2002) introduced 80-score and 90-score criteria in addition to the original 70-score criterion of natural roles. In each project team the number of roles represented at 70, 80, and 90-score criteria is identified. This is exemplified in Figure 2.10 and detailed listing for each team is presented in Appendix 3.10.

	L	M1	M2	M3	M4
IMP	9.29	**95.47**	34.78	14.71	14.71
CO	**86.71**	53.21	**80.37**	55.25	**94.84**
SH	**90.19**	18.74	31.17	54.11	24.53
PL	12.17	17.12	45.07	**71.61**	38.30
RI	34.28	59.73	**75.87**	**95.94**	23.26
ME	**72.14**	43.06	**71.28**	44.06	33.41
TW	54.96	**72.71**	37.04	37.95	**72.71**
CF	31.02	48.07	34.24	22.92	**80.12**

Criterion	Number of team roles represented at the criterion level
70-score	4
80-score	2
90-score	4

90-score criterion 80-score criterion 70-score criterion

Figure 2.12: Example identification number of team roles represented at 70, 80, and 90-score criterion based on Won-Woo and Hojin

It should be noted here that the identification of team roles at different criterion levels has been based on the transformed scores.

Partington and Harris's Team Balance Indexes (1999)

Partington and Harris developed three different team balance indexes (labeled TBI1, TBI2, and TBI3), each with a theoretical maximum value of 100%.

TBI1 was built on the premise that in a balanced team the aggregate score from all members would be evenly spread across all eight roles. The ipsative nature of the SPI requires a total of 70 points to be divided across eight roles. Therefore Partington and Harris claimed that:

> *"In a perfectly balanced team (TBI1 = 100 per cent) the total score of all team members would be 70/8 = 8.75. The higher the aggregate of absolute deviations from this ideal, the lower the team role balance."*

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

An example of calculation of TBI1 is provided in Table 2.32. See Appendix 3.11 for the identification of TBI1 for the project teams in this study.

Table 2.32: An example of calculating TBI1

	L	M1	M2	M3	M4	Role Mean	Absolute Deviations from 8.75	TBI 1(%)
IMP	6	17	9.4	7	7	9.28	0.53	
CO	12	8	11	8.2	14	10.64	1.89	
SH	16	5	7	10	6	8.80	0.05	
PL	2	3	6.8	10	6	5.56	3.19	
RI	6	8	9.4	12.6	5	8.20	0.55	49.81
ME	11	8	10.9	8.1	7	9.00	0.25	
TW	10	12	8.1	8.2	12	10.06	1.31	
CF	7	9	7.4	5.9	13	8.46	0.29	
						Total	8.06	

TB1 = 8 / (8.06 + 8)*100 = 49.81 per cent

TBI2 originates from the presumption that a balanced team would have at least one member scoring *high* or *very high* in as many as possible of the eight roles. The introduction of these two score intervals of very high (VH) and high (H) was based on Belbin's (1981) observation that some of the eight team roles were more popular than the others. With the intention to facilitate a more direct comparison of SPI scores, Belbin developed a table of norm from 78 managers (Belbin, 1981: p.152). Following this approach, Partington and Harris (1999) had produced their own table of norms based on 271 sets of MBA scores. Table 2.33 presents norm tables from Belbin's (1981) and Partington and Harris's (1999) study. Using the norms in Table 2.33, a team is given one point for each team role represented at these two score intervals and two points for each role unrepresented. An example of calculation of TBI2 is given in Table 2.34. In a perfectly balanced team (TBI2 = 100%), as all team roles would be represented, the total points would sum 8.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.33: Norms from literature

		IMP	CO	SH	PL	RI	ME	TW	CF
Low (0-33 %)	Belbin	0-6	0-6	0-8	0-4	0-6	0-5	0-8	0-3
	Partington & Harris	0-8	0-5	0-10	0-5	0-6	0-6	0-6	0-3
Average (33-66 %)	Belbin	7-11	7-10	9-13	5-8	7-9	6-9	9-12	4-6
	Partington & Harris	9-12	6-9	11-14	6-9	7-10	7-9	7-10	4-6
High (66-85 %)	Belbin	12-16	11-13	14-17	9-12	10-11	10-12	13-16	7-9
	Partington & Harris	13-16	10-12	15-19	10-14	11-13	10-11	11-14	7-10
Very high (85-100 %)	Belbin	17-23	14-18	18-36	18-29	12-21	13-19	17-25	10-17
	Partington & Harris	17-27	13-27	20-31	15-36	14-25	12-25	15-26	11-19

Source: Belbin (1981, p. 158), N = 78, managers; Partington and Harris (1999, p. 700), N = 271, MBA students

Table 2.34: An example of calculating TBI2

	L	M1	M2	M3	M4	Points	TBI 2 (%)
IMP	L	**VH**	L	L	L	1	
CO	**H**	A	**H**	A	**VH**	1	
SH	**VH**	L	A	**H**	A	1	
PL	L	L	A	**H**	A	1	
RI	L	A	**H**	**VH**	L	1	88.89
ME	**H**	A	**H**	A	L	1	
TW	A	A	L	L	A	2	
CF	L	A	L	L	**H**	1	
					Total	9	

TB2 = (8 / 9) * 100 = 88.89 per cent

On account of the possibility that the current study group (engineering students) may differ, in terms of their preferences, from a study sample composed of managers and MBA students, it was considered necessary to develop a table of norms for the present study. Table 2.35 presents this table of norms calculated from 143 engineering students from 24 teams. According to norms of presented for the managers and MBA student sample in Table 2.33 a score of 13 in shaper role indicates an average preference for this role. However, based on the norms of this study, the same score indicates a very high preference for the shaper role, a level shown by 15 per cent of engineering students. Appendix 3.12 present the calculation of TBI2 for the project teams in this study.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 2.35: Norms for this study

	IMP	CO	SH	PL	RI	ME	TW	CF
Low (0-33 %)	0-9	0-6	0-5	0-5	0-6	0-7	0-8	0-7
Average (33-66 %)	10-12	7-9	6-8	6-8	7-8	8-10	9-12	8-11
High (66-85 %)	13-15	10-12	9-12	9-12	9-10	11-12	13-14	12-14
Very high (85-100 %)	16-20	13-19	13-27	13-27	11-17	13-25	15-23	15-22

Note: N=143 engineering students from 24 project team (24 team leaders and 119 team members)

The third balance index (TBI3) is based on Belbin's assertion that team roles should not be duplicated; hence it assumes that there would be only *one* team member scoring high or very in as many as possible of the eight team roles. Based on this approach, each team was given one point for each representation of a role and two points for each role unrepresented. Based on this approach, a perfectly balanced team (TBI3 = 100%) would consist of 8 members, each with a single, different role and would have 8 points. Table 2.36 provides an example calculation of TBI3 based on TBI2. See Appendix 3.13 for the calculation of TBI3 for the project teams in this study.

Table 2.36: An example of calculating TBI3

	L	M1	M2	M3	M4	Points	TBI 3 (%)
IMP	L	**VH**	L	L	L	1	
CO	**H**	A	**H**	A	**VH**	3	
SH	**VH**	L	A	**H**	A	2	
PL	L	L	A	**H**	A	1	
RI	L	A	**H**	**VH**	L	2	66.67
ME	**H**	A	**H**	A	L	2	
TW	A	A	L	L	A	2	
CF	L	A	L	L	**H**	1	
					Total	12	

TB2 = (8 / 12) * 100 = 66.67 per cent

Fisher's Task-Relationship Construct: Role-Pair Suitability

The notion of role pair suitability is based on the study of Fisher *et al.* (1998) which identified two major groups underlying Belbin's original eight team roles (Figure 2.13). Each group clustered a total of four team roles that, collectively, had a common dimension; which were namely "relationship" and "task". As it is demonstrated in Figure 2.13, the task group clustered the roles of

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shaper, plant, monitor evaluator, and completer finisher. The relationship group clustered the roles of co-ordinator[12], resource investigator, team-worker, and implementer[13]. Depending on the combinations of the team role pair harmonious and productive interaction does exist or not.

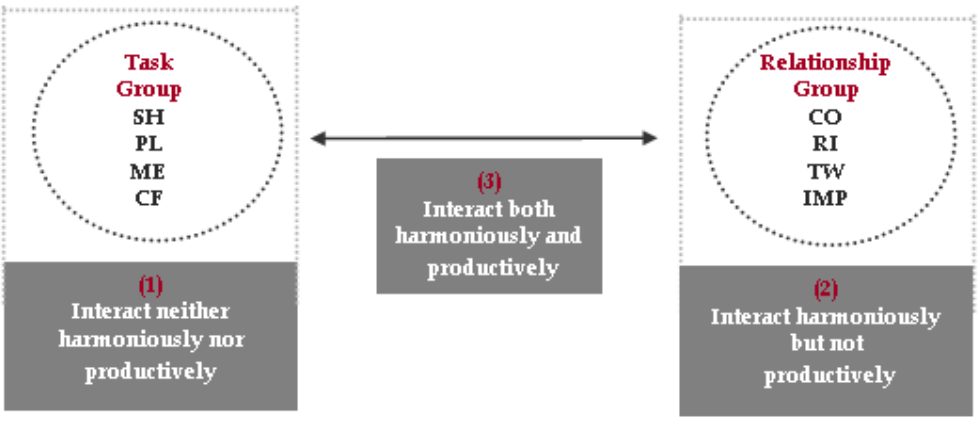

Figure 2.13: Representation of Fisher's task and relationship construct and its use in prediction of degree of harmony and productiveness of role pair combinations (Fisher *et al.*, 1998).

Based on the ideas presented in the Fisher *et al.* (1998) study, in each team the members were categorized into three interaction categories based on their role-pairings (primary and secondary team roles):

Type 1 (T1) Interact neither harmoniously nor productively.
Team roles that both fall into the "task" group (e.g. shaper and plant).

Type 2 (T2) Interact harmoniously but not productively.
Team roles that both fall into the "relationship" group (e.g. coordinator and teamworker).

Type 3 (T3) Interact both harmoniously and productively.
Team roles that both fall into one of each group (e.g. plant and teamworker).

In each project team, the number of members in each of the three categories mentioned above is calculated. See Table 2.37 for an example. See Appendix 3.14 for the identification of team members' role pairings for the project teams in this study.

[12] The original name "chairman" was used in their study
[13] The original name "company worker" was used in their study

Table 2.37: Example identification of team members' role pairings and their classification into three interaction categories

Members	First Pair	Second Pair	Type	Total
L	SH	PL	T1	
M1	RI	CO	T2	$N_{T1} = 1$
M2	CO	ME	T3	$N_{T2} = 2$
M3	IMP	TW	T2	$N_{T3} = 2$
M4	IMP	CF	T3	

2.6. STATISTICAL ANALYSES

The statistical procedures used in this study are outlined in Figure 2.14. The **normality of data** has been tested before conducting correlation analyses and independent t-tests. **Homogeneity of variance** has been checked before the independent t-test.

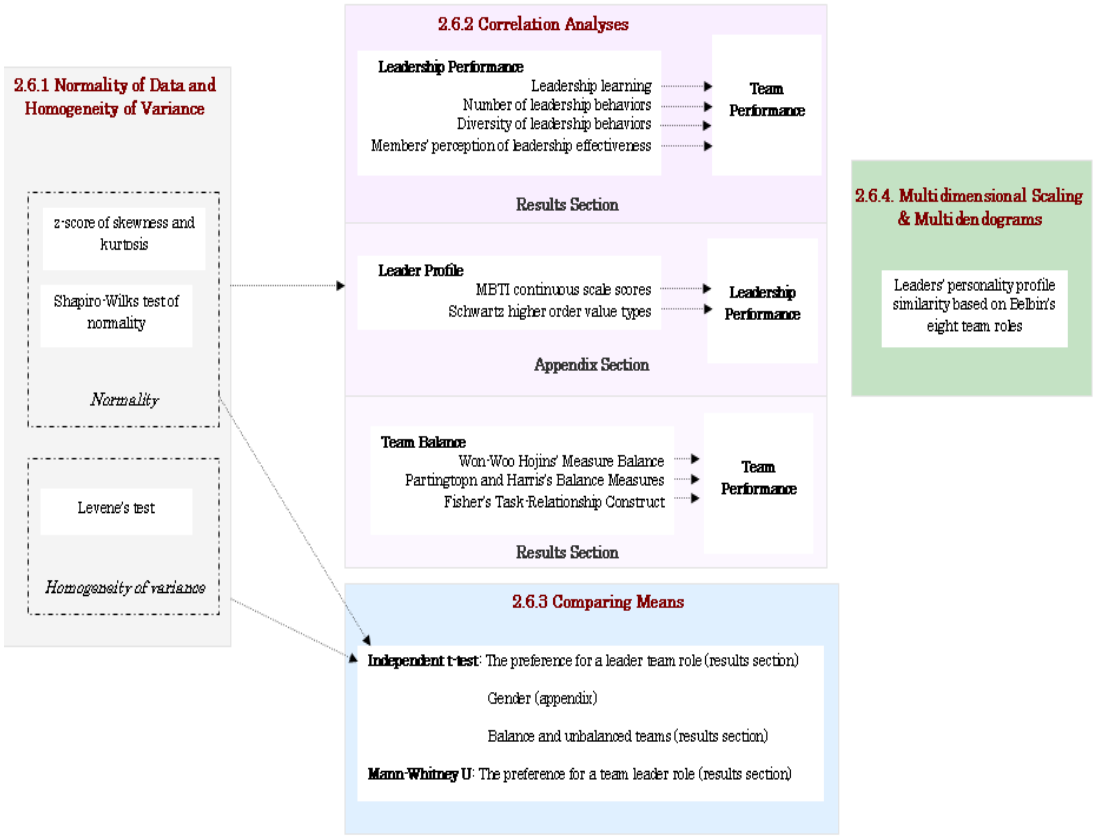

Figure 2.14: Statistical procedures used in the present study

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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Correlation analyses have been performed to investigate the relationships between:

- leadership performance variables and team performance
- leaders' continuous MBTI scores and team performance
- leaders' higher order values types and team performance
- team balance and team performance

Pearson correlation coefficients have been reported for the normally distributed data and Spearman's rank correlation coefficients have been reported for the non-normally distributed data.

Independent t-tests have been performed to compare the means of two groups. As such it has been investigated whether:

the leader students with a clear preference for a "leadership role" (shaper or coordinator), G1, show better leadership performance than those leader students who did not have a clear primary preference for a "leadership role", G2

there are gender differences on performance variables

balanced teams perform better than unbalanced teams

Mann-Whitney U test has been conducted to test the leadership performance differences between leaders with preference for a leader role and leaders without preference for a leader role when the assumption of normality was violated (results presented in Section 3.4.2).

Multidimensional scaling and **Multidendograms** have been used to investigate the differences in leadership performance based on the profile similarities of the leader students. Leader profile similarity has been based on the leader students' preferences on Belbin's eight team roles. The following sub-sections provide information on these statistical procedures.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

2.6.1. NORMALITY OF DATA AND HOMOGENEITY OF VARIANCE

The tests used in this study (correlation and independent t-tests) are parametric tests which require the following assumptions to be met (Field, 2005):

(1) *Normally distributed data*: The parametric tests assume that the data are from normally distributed populations and if this assumption is not met then the logic behind hypothesis testing is flawed.

(2) *Homogeneity of variance*: The parametric tests assume that the variances are same throughout the data.

Normality of Data

The assumption of normal distribution has been checked with the z-scores of skewness and kurtosis and the Shapiro-Wilk's W normality test which are explained in below.

Z-score of Skewness and Kurtosis

Kurtosis and Skewness measure the degree to which a set of data value differs from the normal distribution. In a normal distribution, the values of skewness and kurtosis equal to zero and the further the value is from zero, the more likely that the data are not normally distributed (Field, 2005). Positive values of skewness indicate that the distribution has a long tail in the positive direction (See Figure 2.15, left-hand side) and negative values of skewness indicate a long tail in the negative direction (See Figure 2.15, right-hand side).

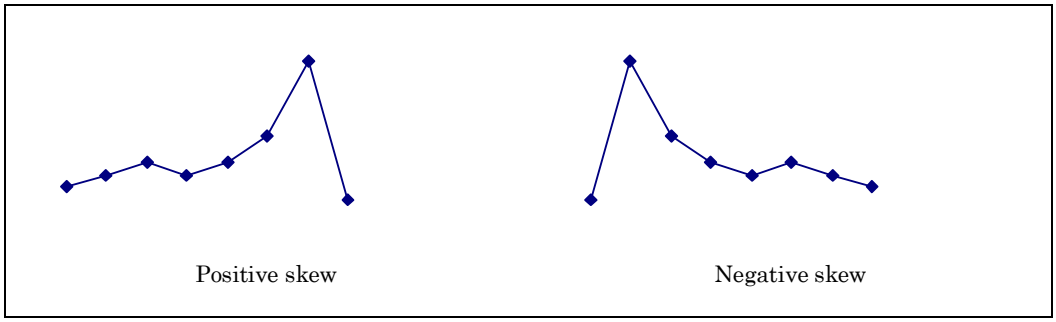

Figure 2.15: Examples of positive and negative skew

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Field (2005) in his book states that actual values of skewness and kurtosis are not informative; instead the z-score values should be investigated. The z-score of skewness and kurtosis can be used to identify if the skewness and kurtosis is significant. A z-score (in absolute values) greater than 1.96, indicates significant skewness (or kurtosis) at $p < 0.05$; meaning that the data is not normally distributed (Field, 2005; Peat & Barton, 2005). Field (2005) suggests that in small samples this criterion should be increased to 2.58. In this study, the z-score value has been set at ± 2.58 due to the small sample size.

Skewness and kurtosis values have been converted to z-scores by the following equation (Field, 2005):

$$z_{skewness} = \frac{S - 0}{SE_{skewness}} \qquad z_{kurtosis} = \frac{K - 0}{SE_{kurtosis}}$$

S: The value of skewness

K: The value of kurtosis

$SE_{skewness}$: Standard error of skewness

$SE_{kurtosis}$: Standard error of kurtosis

Shapiro-Wilk Test of Normality

The skewness and kurtosis statistics, explained above, indicates deviations from normality, however an objective test is needed to know whether the distribution as a whole deviates from normal distribution (Field, 2005). There are two test statistics for detecting the presence of non-normality, namely, Shapiro-Wilk and Kolmogorov-Smirnov. As the sample size was less than 2000, the former was used in this study (Shapiro & Wilk, 1965). For the Shapiro-Wilk test, a p value less than 0.05 indicates a non-normal distribution (Field, 2005; p.94). If the test is non-significant ($p > 0.05$) it means that the distribution of the data is probably normal.

Transformation of data

For the variables that violated the assumptions of normality, following transformations have been applied to derive the drive data into the normality (Field, 2005; Munro, 2005; Wheather and Cook, 2000):

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Substantial positive skew: Logarithmic transformation (base 10) was applied.

Substantial negative skew: The data were first reflected by subtracting each score from one plus the highest score in the distribution, then the data were log-transformed and then were reflected again.

Following the transformation, the normality of data has been checked again. After confirming the normality, those transformed scores have been used in all subsequent analyses.

When the transformations did not improve the distribution of data, non-parametric tests has been utilized (Spearman correlation coefficient and Mann-Whitney test).

Homogeneity of Variance

Homogeneity of variance has been tested by Levene's test. This test tests the assumption that the variances in the groups are equal. Hence, if Levene's test is significant at $p < 0.05$ then the assumption of homogeneity of variances has been violated. If the Levene's test is non-significant, $p > 0.05$, it means that the variances are roughly equal and the assumption is tenable (Field, 2005).

2.6.2. CORRELATION ANALYSES

Correlation is defined as "the degree to which the values of two variables vary together in a consistent fashion" (Rubin, 2007). In this study, bivariate correlation coefficients were calculated which is known as the correlation between two variables. Correlation coefficient is a measure of association between two numerical variables and can range from -1 to + 1, and the minus and plus sign in front of the correlation coefficient indicates the direction of the correlation (Rubin, 2007):

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Positive Correlation (+)	The variables move in the **same** direction. As the values of one variable increase, the values of the other variable tend to increase *or* as the values of one decrease the values of the other tend to decrease.
Negative Correlation (-)	The variables move in **opposite** direction. When the one variable goes up, the other one goes down.

For the normally distributed data Pearson correlation coefficients (r) have been calculated. Pearson correlation coefficient may range from -1 to +1, with "0" representing no correlation.

For the non-normally distributed data, Spearman rank correlation coefficients have been reported. Spearman rank correlation, as the name implies, is calculated by applying the Pearson correlation formulas to the *ranks* of the data rather than to the actual data values themselves. In so doing, many of the distortions that infect the Pearson correlation are reduced considerably. Spearman's *rho* produces correlation coefficients ranging from -1 to +1 that have the same meaning as Pearson's r (*R*ubin, 2007).

According to Cohen's characterization, the correlation coefficients reflect the following effect sizes in light of the nature and characteristics of behavioral or social sciences (Cohen, 1988: p. 78–83).

$r = 0.1$ a small effect size

$r = 0.3$ a medium effect size

$r = 0.5$ large effect size

For the significant correlations (as measured by Pearson correlation coefficient), the scatter plots have presented in due place. One-tailed significance levels have been reported when there was a priori prediction.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

2.6.3. COMPARING MEANS

The following two tests have been performed to test the group mean differences:

(a) Independent t-tests

(b) Mann-Whitney U test

Independent t-test

The independent t-test is used when you have the means of two separate, normally distributed, groups that you want to compare. The purpose of the independent t test is to determine if the two samples are significantly different then on another. In the present study, independent t-test has been used to identify whether:

> The leader students with a clear preference for a "leadership role" (shaper or coordinator), G1, show better leadership performance than those leader students who did not have a clear primary preference for a "leadership role", G2.
>
> The female leader students (G1) differ significantly from male leader students (G2) on team and leadership performance.
>
> Balanced teams (G1) perform better than unbalanced teams (G2).

A test statistic being significant does not necessarily mean that the effect it measures is meaningful as well (Field, 2005). Effect size is used to identify whether the size of the observed relationship is substantial. The effect size (r) is calculated using the following equation (Field, 2005):

$$r = \sqrt{\frac{t^2}{t^2 + df}}$$

t: is calculated by dividing the means of differences by the standard error of differences.

df: is the degrees of the freedom

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

*The **t** and **df** values are automatically generated by the SPSS programme.*

Mann-Whitney U Test

Mann-Whitney U test is the non-parametric equivalent of the independent t-test (Field, 2005) so it is used when the distributional assumptions needed for the appropriate application of independent t-test have not been made. In the present study, *exact tests* have been reported due to small sample size (Field, 2005; p.529).

The effect size for Mann-Whitney test is calculated by the following equation:

$$r = \frac{Z}{\sqrt{N}}$$

Z: is the z score.

N: is the total number of observations on which the z-score is based.

2.6.4. MULTIDIMENSIONAL SCALING (MDS) AND MULTIDENDOGRAM METHODS

Multidimensional scaling (MDS) and Multidendogram methods have been utilized to investigate the leaders' profile similarity on leadership performance using the leader students' preferences on the eight Belbin team roles.

Multi-dimensional Scaling

MDS is defined as (Cox and Cox, 2001):

> "the search for a low dimensional space, usually Euclidean, in which the points in the space represent the objects, one point representing one object, and such the distances between the points in the space, match, as well as possible, the original dissimilarities."

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

For a given set of observed similarities between every pair of N items, MDS finds a representation of the items in as few dimensions as possible, such that the similarities in the lower dimension match as closely as possible the original similarities (Johnson, 1998). MDS plots the objects on a map such that objects that are very similar to each other are placed near each other and objects that are very different from each other are placed far away from each other on the map. The example given in Figure 2.16 shows the distances between the cities.

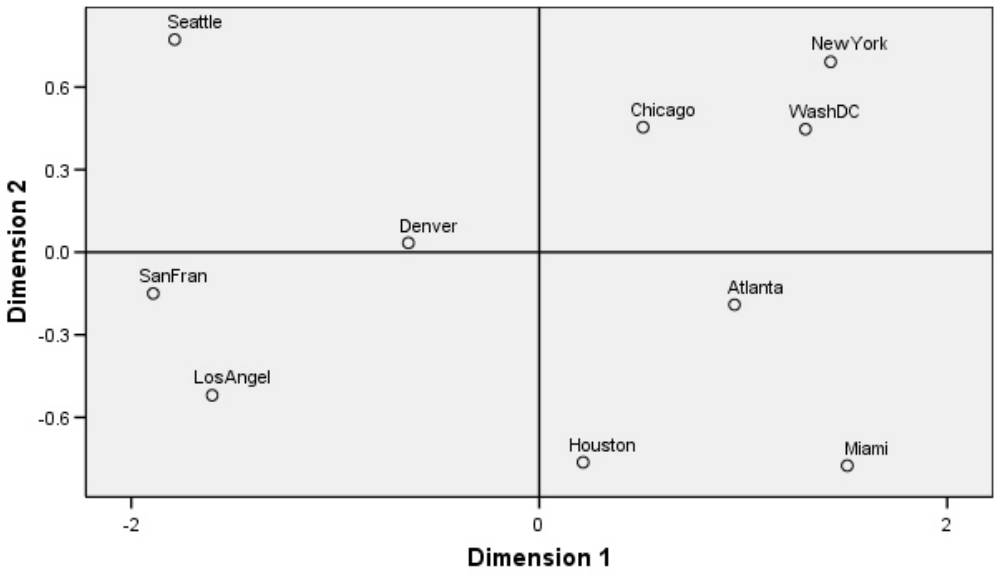

Figure 2.16: MDS plot showing the distances between cities

MDS can be carried out on data relating to objects (inanimate things), individuals and subjects (people or animals) or stimuli to one another (non-tangible entities) (Cox and Cox, 2001). In this study, the similarity between the leader students has been investigated based on their preference scores on the eight team roles. Role scores have been normalized by the following formula:

$$x - x_{\min} \Big/ x_{\max} - x_{\min}$$

A numerical measure of the closeness between the similarities in the lower dimensional and the original spaces is called the stress (also called badness-of-fit). The stress has a value between 0 and 1, with 0 indicating perfect

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fit and 1 indicating worst possible fit. In the present study, the analyses have been restricted to two dimensions and the stress value for the MDS was 0.05.

Multidendograms

Clustering methods group individuals into groups of individuals (or clusters) so that individuals in a cluster are close to one another. Then, clusters are themselves grouped into groups of clusters (or supercluster) and the process is repeated until forming a complete hierarchy (Fernández and Gómez, 2008). Figure 2.17 presents an example.

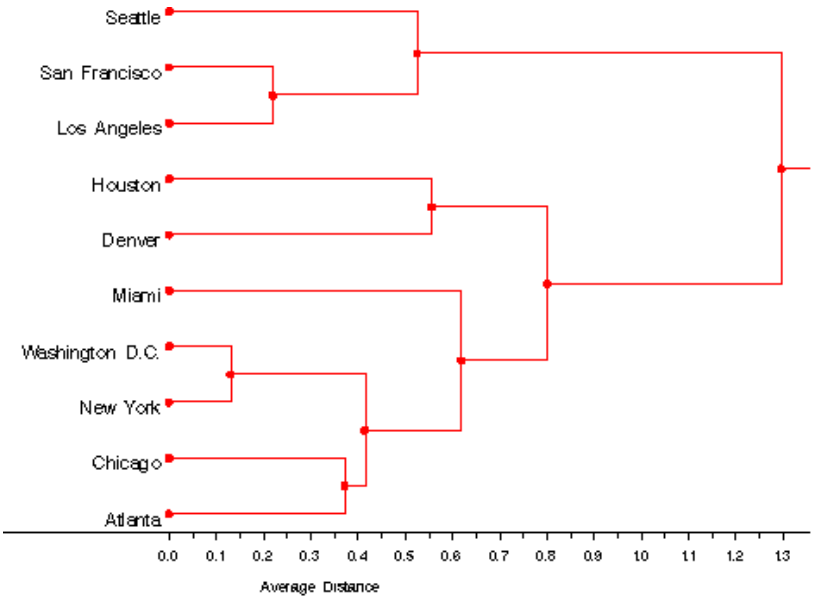

Figure 2.17: Clustering the cities based on distances

In this study MultiDendrograms has been used. Multidendograms starting from a distances (or weights) matrix calculates its dendrogram using the most common Aglomerative Hierarchical Clustering algorithms (in this study unweighted average), allows the tuning of many of the graphical representation parameters (Fernández and Gómez, 2008). The present study has used the leader students' normalized scores on the eight team role.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

2.7. CASE STUDIES

This study involves two "case studies". The aim of the case studies is to provide an in-depth analysis of the leadership behaviors (both effective and ineffective). The two leader students have been analyzed and their selection has been based on their primary team role preferences:

The 1st case study: "L1" had a clear primary team role preference for a leadership role (shaper).

The 2nd case study: "L2" did not have a preference for a leadership role (implementer).

Five research tools have been used in the case studies:

(1) Learning journals
(2) Behavioral event interviews
(3) 360 degree feedback process
(4) Focus group
(5) Team climate

The **learning journals** have been used to identify: (1) leaders' entries, i.e. regularity and frequency, (2) the leadership behaviors, and (3) the leader's perceptions about her/his team and (4) their characteristic behaviors.

The analysis of **behavioral event interview** consists of three subsections

1st subsection: *Leadership Behaviors*. It identifies quantitatively the effective leadership behaviors shown by the leader students.

2nd subsection: *Qualitative Analysis of Critical Events*. It provides leaders' thoughts, feelings and actions regarding the incidents described by the leaders.

3rd subsection: *Other Interview Questions*. Leader's responses to the open interview questions such as: (1) the past experiences that had helped the leader student to perform the leader role, (2) her/his motivations to become a team leader, and (3) the typical tasks s/he had carried out during a week when s/he was leading the project team have been described.

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The analysis of **360 degree feedback** presents: (1) the comparison of those leaders' self and member ratings with the group of leaders, (2) the degree of congruence between the leaders' self rating and the ratings given by their team members.

Self-other agreement is identified by utilizing the procedure developed by Atwater and Yammarino (1992). This procedure categorizes self-raters into one of three agreement groups relative to the rating of others (over-estimator, in-agreement, and under-estimator):

Overestimators:	Difference scores are one-half standard deviation or more **above** the mean difference score are categorized as
Underestimators:	Difference scores are one-half standard deviation or more **below** the mean are classified as
In-agreement:	Difference scores are **within** one half standard deviation, plus or minus, of the mean areconsidered to be

The **focus group** have been conducted with the team members of each team seperately. The members have been asked to state their opinion about the effectiveness of their respective leaders.

The **team climate** has been measured by the use of the "team climate survey". This survey has been completed by both the leader and the members in the 1st and the 2nd academic semesters. The ratings on the 22 survey items have been averaged for member and leader rating to obtain an overall climate rating. Specific survey items on which the participants have changed their ratings have been also presented. The participants' verbatim comments regarding what they liked most and least about the integrated design project have been also provided.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

CHAPTER 3

RESULTS and DISCUSSION

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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3. RESULTS

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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The results are presented in five separate subsections as shown in Figure 3.1.

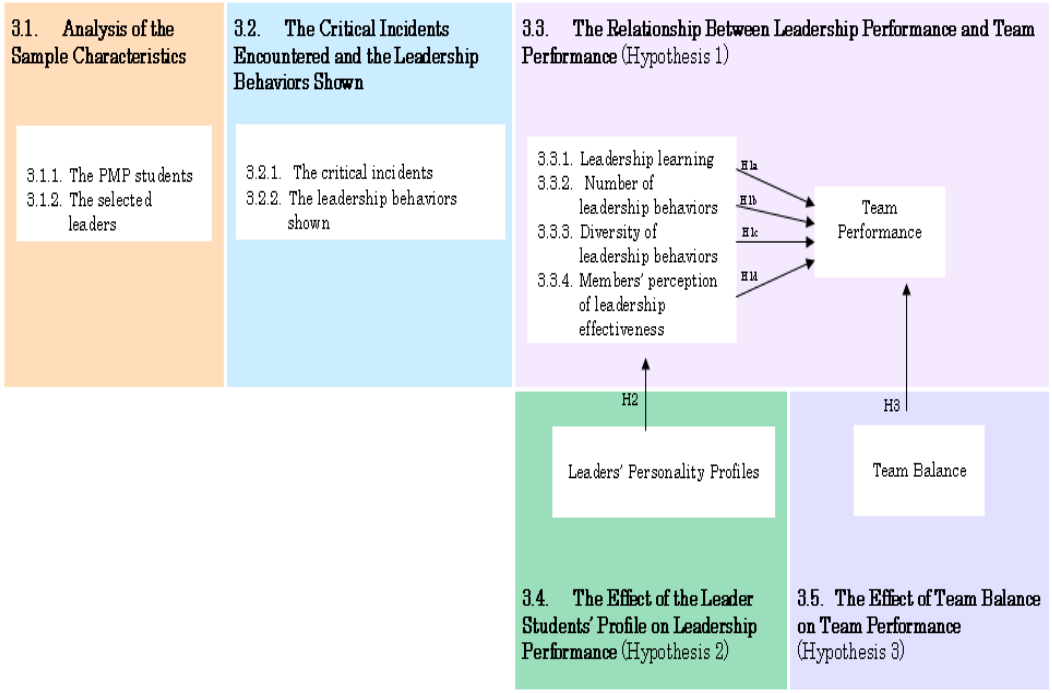

Figure 3.1: The outline of the results section

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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

3.1. ANALYSES OF THE SAMPLE CHARACTERISTICS

This section aims to provide the general characteristics of the study sample (Figure 3.2). The analyses of the characteristics will begin with the PMP students and will continue with the selected leader students.

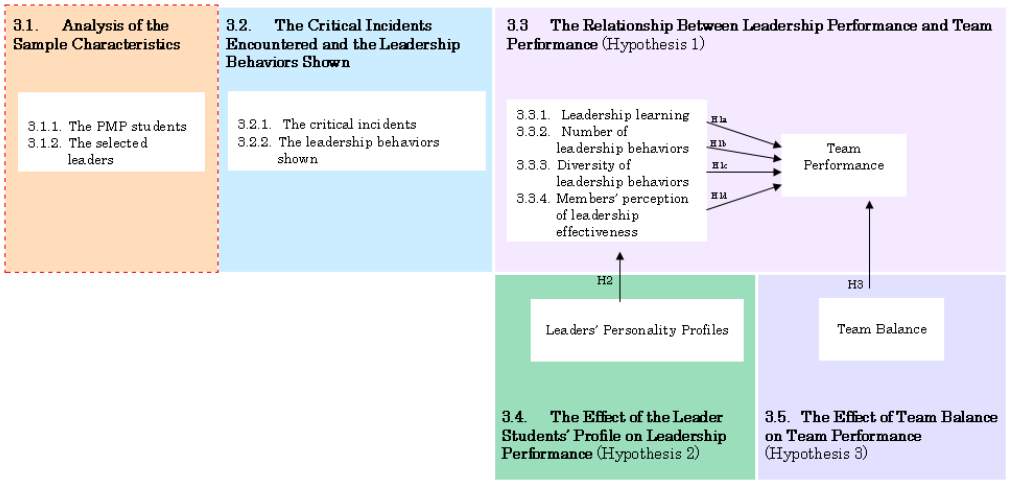

Figure 3.2: Schematic view of Section 3.1 in the results section

3.1.1. ANALYSES OF THE CHARACTERISTICS OF THE PMP STUDENTS

The below characteristics are analyzed for the PMP students:

(a) Gender
(b) Academic eligibility
(c) Motivation to lead
(d) Team role preferences
(e) Managerial styles
(f) MBTI types
(g) Value types

A comparison between the PMP students and other study populations (e.g. managers) are provided for the last four characteristics shown above (from item "d" to item "g").

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

PMP Students' Gender

A total of 63 students were enrolled to PMP course in two consecutive academic years and the gender distribution was almost equal in both academic years (Table 3.1).

Table 3.1: Frequency distribution of the PMP students by gender and by academic year

			Gender		
			Male	Female	Total
Academic Year	2007-2008	Frequency	16	17	**33**
		% within Academic Year	48.5%	51.5%	100.0%
	2008-2009	Frequency	14	16	**30**
		% within Academic Year	46.7%	53.3%	100.0%
	In General	Frequency	30	33	**63**
		% within Academic Year	47.6%	52.4%	100.0%

PMP Students' Academic Eligibility and Motivation to Lead

It can be seen in Figure 3.3 that the number of academically eligible and not eligible students were almost equal in the 2007-2008 academic year ($N_{eligible}$ = 18, $N_{not\ eligible}$ = 15). Conversely, in 2008-2009, the academically eligible students comprised a majority of the PMP students ($N_{eligible}$ = 28; 93%, $N_{not\ eligible}$ = 2; 7.0%).

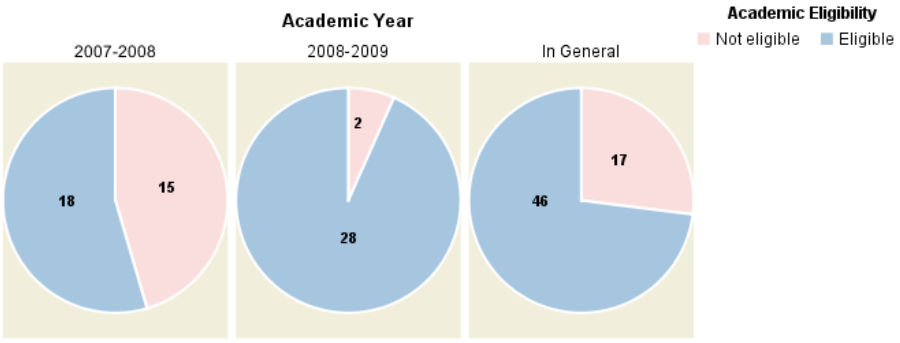

Figure 3.3: Frequency distribution of the PMP students by their academic eligibility and by academic year

As shown in Figure 3.4, the number of students with and without motivation to lead were nearly the same in the 2007-2008 academic year (N_{has}

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

$_{motivation}$ = 18, N $_{no\ motivation}$ = 15) and in the 2008-2009 academic year most of the students had the motivation to lead the integrated design project teams (N $_{has\ motivation}$ = 22; 73%, N $_{no\ motivation}$ = 8; 27%).

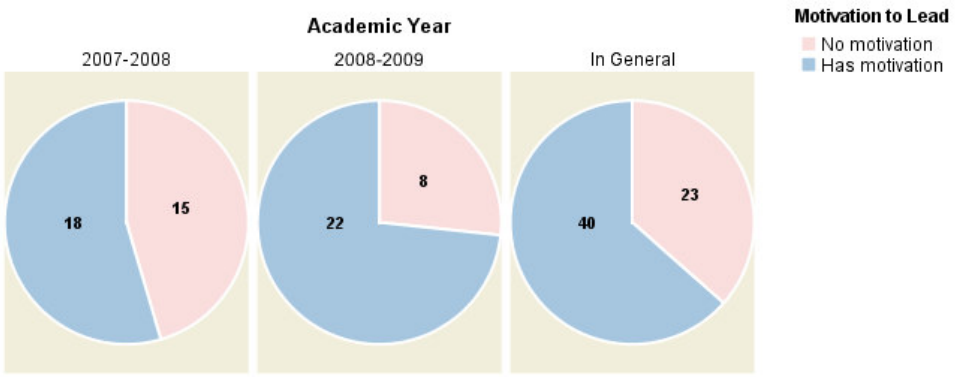

Figure 3.4: Frequency distribution of the PMP students by their motivation to lead and by academic year

Of the 18 academically eligible students in the 2007-2008 academic year, 9 of them were also motivated to lead the IDP teams (Figure 3.5). In 2008-2009 year, 28 students had the academic eligibility and most of those students wanted to lead the project teams as well (N $_{eligible,\ has\ motivation}$ = 21; 75%, N $_{eligible,\ no\ motivation}$ = 7; 25%).

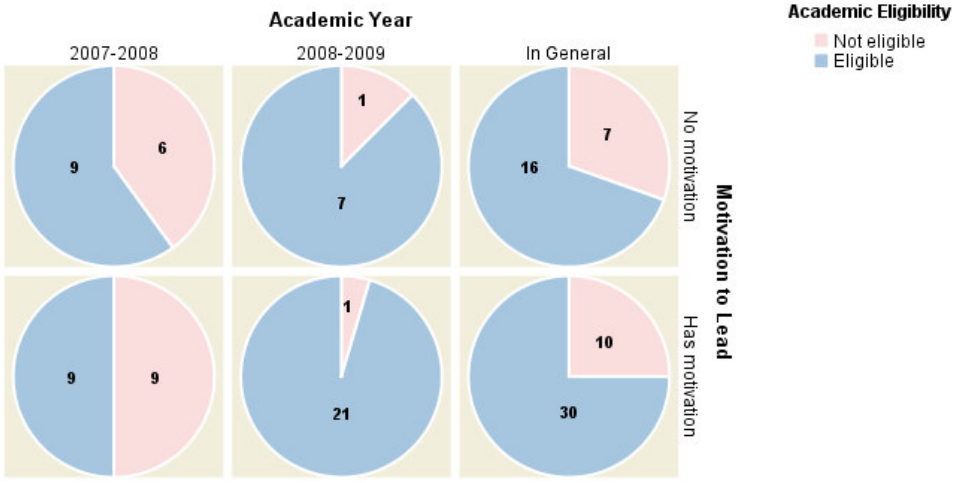

Figure 3.5: Frequency distribution of the PMP students by their motivation to lead, academic eligibility and academic year

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

In summary, the students with academic eligibility and motivation to lead comprised nearly 27% of the PMP students in the 2007-2008 academic year (9/33*100 = 27%).

In the 2008-2009 academic year, the students with academic eligibility and motivation to lead comprised 70% of the PMP population (21/30*100 = 70%).

These results indicate that the number of the students who posses academic eligibility and motivation to lead in the PMP course might vary greatly from one year to another.

PMP Students' Belbin Team Role Preferences

The analysis of the PMP students' Belbin team role preferences have been based on a total 63 PMP students and investigated in terms of:

- The frequency distribution of their primary team role preferences
- The mean scores of the eight team roles for this sample

Frequency Distribution of the PMP Students' Primary Role Preferences

The bar chart in Figure 3.6 shows the frequency distribution of the PMP students' primary team role preferences. The results indicate that the "shaper", "completer finisher" and "implementer" were the three most frequently occurring primary roles. On the other hand, the "plant", "coordinator" and "resource investigator" were the scarcest primary team roles for the PMP students.

PMP students seem to differ from 4th mechanical engineering students in terms of their role preferences. The study of O'Doherty (2005) reported "plant", "resource investigator", and "implementer" as the most preferred roles and "teamworker" and "shaper" as the least preferred roles among the mechanical engineering students.

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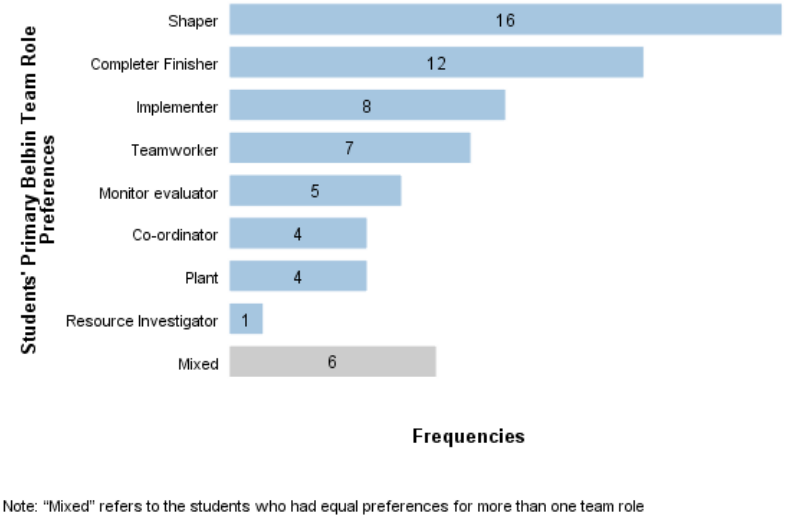

Figure 3.6: Frequency distribution of the PMP students' primary team role preferences ($N_T = 63$)

The Mean Scores of the Eight Team Roles for the PMP Students

The means of the eight team roles for the PMP students have been computed and compared with other sample from literature.

Fisher, Hunter, and Macrosson (2000) and Dulewicz (1995) studied the team roles of "managers", Fisher *et al.* (2002) investigated the roles of "non-managers", and Yearn, Threlfall, and Haslett (2003) examined the roles of "consultants" (see Appendix 4A-1 for the means, standard deviations of team roles from these studies and the present study). The ranking of the means of scores from these studies and the present study is summarized in Table 3.2.

Table 3.2: Rank order of the mean scores of the eight team roles

Sample	Rank order of means for team roles	Reference
Engineering Students	SH > IMP > CF > TW > CO > ME > RI > PL	**Present study**
Consultants (Bench)	IMP > SH > CO > CF > ME > RI > TW > PL	Yearn *et al.* 2003
Managers	RI > CO > TW > IMP > PL > CF > SH > ME	Dulewicz, 1995
Managers	RI > CO > TW > IMP > PL > SH > CF > ME	Fisher *et al.* 2000
Non-managers	PL > IMP > CO > TW > SH > CF > RI > ME	Fisher *et al.* 2002

Note: "SH" = Shaper, "IMP" = Implementer, "CF" = Completer finisher, "TW" = Teamworker, "CO" = Coordinator, "ME" = Monitor Evaluator, "RI" = Resource Investigator, "PL" = Plant

UNIVERSITAT ROVIRA I VIRGILI
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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

It can be seen that in our sample the roles of "shaper" and "implementer" had the highest mean scores and the roles of "resource investigator" and the "plant" had the lowest means.

This way, the ranking of the PMP students' role preferences resembled most the ones of the consultants (Yearn *et al.*, 2003); in that sample the "shaper" and "implementer" roles also had the highest mean scores and the "plant" role had the lowest mean score.

It is also clear from Table 3.2 that our sample was different from the ones of managers and non-managers. The most striking difference between our sample and the managers was the "resource investigator" role. In the sample of managers, this role had the highest mean score. Conversely, in our sample, the mean score for this role was relatively very low. Another remarkable difference between engineering students and the managers was the "shaper" role. In our sample, the "shaper" role had the highest mean score whereas in the sample of managers the mean score for this role was relatively low in comparison to the other team roles.

Our data did not resemble the ones of non-managers either. In that sample, the "plant" role had the highest mean scores. On the contrary, this role had the lowest mean score in our sample.

PMP Students' Perceived Primary Managerial Styles

The analysis of the PMP students' managerial styles have been based on a total 63 PMP students and investigated in terms of:

- The frequency distribution of their perceived dominant managerial styles
- The mean scores of the six managerial styles

Frequency Distribution of the PMP Students' Perceived Dominant Managerial Styles

The frequency distribution of PMP students' perceived dominant managerial styles is shown in Figure 3.7. These results demonstrate that the PMP students, most frequently, saw themselves as "affiliative" and "pacesetting" and they less frequently perceived themselves as "democratic" and "coaching".

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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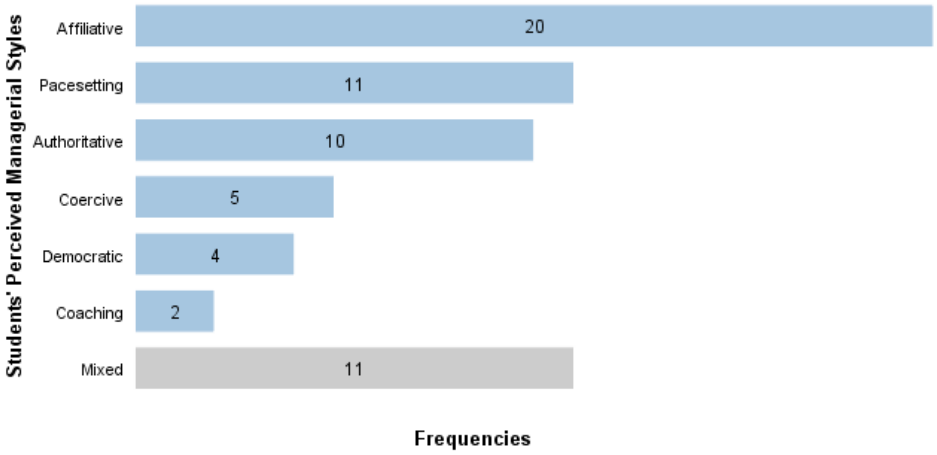

Note: "Mixed" refers to the students who had equal preferences more than one managerial style

Figure 3.7: Frequency distribution of the PMP students' perceived dominant managerial styles ($N_T = 63$)

The Mean Scores of the Six Managerial Styles of the PMP Students

The means for the six managerial styles have been calculated[1] and compared with the sample of HayGroup (Anderson and Zhu, 2002) and with the sample from Middle East and America (Bakhtari, 1995). The ranking of the mean scores for the managerial styles are summarized in Table 3.3.

Table 3.3: Rank order of the mean scores of six managerial styles

Participant	Rank order of means for team roles	Reference
Engineering Students	AUT > DEM > COA > AFF > PCS > COE	**Present study**
HayGroup Sample	AUT > AFF > DEM > COA > PCS > COE	Anderson & Zhu, 2002
American Sample	PCS > AUT > DEM > AFF > COA > COE	Bakhtari, 1995
Middle East Sample	AFF > AUT > PCS > DEM > COA > COE	Bakhtari, 1995

Note: "AUT" = Authoritative, "DEM" = Democratic, "COA" = Coaching, "AFF" = Affiliative, "PCS" = Pacesetting, "COE" = Coercive

[1] The means, standard deviations of the managerial styles for the above mentioned samples can be found in Appendix 4A-2 together with the sample of the PMP students.

ISBN:978-84-693-5423-0/DL:T-1414-2010

In both our sample and the HayGroup sample the "authoritative" style had the highest mean score and "pacesetting" and "coercive" styles had the lowest mean scores. In the American sample, "pacesetting" style had the highest mean score and in the Middle East Sample "the affiliative" style.

It can be seen from the above table that the "coercive" style had the lowest mean scores in all of the samples presented in Table 3.3.

PMP Students' MBTI Types

The analysis of the PMP students' MBTI types have been based on a total 63 PMP students and investigated in terms of:

- The frequency distribution of their MBTI types (e.g. "ISTJ, "ENTJ", etc.)
- The distribution of PMP students' in four preference pairs (i.e. "E", "I", "S", "N", "T", "F", "J", and "P") and its comparison with other samples.

The Frequency Distribution of the PMP Students' MBTI Types

The distribution of the PMP students' MBTI types is summarized in Table 3.4. It is clear that the PMP students consisted of mainly ESTJs (31.7%) and ISTJs (25.4%). This result indicates a preference for the STJ type (57.1%) for the PMP students.

Table 3.4: Frequency and percent of MBTI types for the PMP students (N=63)

ISTJ 16 25.4%	**ISFJ** 2 3.2%	**INFJ** 1 1.6%	**INTJ** 4 6.3%
ISTP 5 7.9%	**ISFP** 0 0%	**INFP** 0 0%	**INTP** 0 0%
ESTP 4 6.3%	**ESFP** 0 0%	**ENFP** 2 3.2%	**ENTP** 3 4.8%
ESTJ 20 31.7%	**ESFJ** 3 4.8%	**ENFJ** 0 0%	**ENTJ** 3 0%

UNIVERSITAT ROVIRA I VIRGILI
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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

There was a close similarity between the personal preferences of our PMP students and the Finnish business students (Järlström, 2002); the Finnish sample was also compromised of ESTJs (15%) and ISTJs (13%). However, in another study in which the sample was composed of entrepreneurs, inventors, administrators, and MBA students, the mostly preferred MBTI types were ENTP (20.5%) and INTJ (16.4%).

The Distribution of PMP Students' in Four Preference Pairs and its Comparison with Other Samples

The PMP students' distributions in four preference pairs are illustrated in Table 3.5 together with the ones from the other study populations. At the preference level, the majority of the PMP students had a preference for Extraversion (55.6%), Sensing (79.4%), Thinking (88.9%) and Judging (76.2%).

At the **Extraversion-Introversion** scale, the PMP students' showed similar preferences with the other study populations except for the engineering project members; the majority of this sample exhibited preferences for Introversion (62%).

At the **Sensing-iNtuition** scale, the PMP students and engineering project members, accounting students and the leaders exhibited preferences for Sensing whereas computer engineering and medical students, executives, entrepreneurs, and management consultants in general preferred iNtuition.

At the **Thinking-Feeling** scale, all the study populations but medical students exhibited preference for Thinking; medical students mostly preferred Feeling (66.4%).

At the **Judging-Perceiving** scale, the majority of all the study populations presented in Table 3.5 had a preference for Judging.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 3.5: Percentage distributions of different samples in four preference pairs

Sample	Sample Size	Percentage of MBTI preferences								Source
		% E	% I	% S	% N	% T	% F	% J	% P	
PMP students	63	**55.6**	44.4	**79.4**	20.6	**88.9**	11.1	**76.2**	23.8	Present Study
Engineering project members	218	38	62	54	46	75	25	67	33	Culp and Smith, 2001
Computer engineering students	44	50	50	40.9	59.1	65.39	34.1	75	25	Karn and Cowling, 2004
Undergraduate accounting students	152	55	45	79	21	65	35	69	31	Wolk and Nikolai, 1997
Medical students	116	68.1	31.9	44.8	55.2	33.6	66.4	57.8	42.2	McNulty *et al.* 2006
Leaders	439	75	25	57	43	73	27	77	23	Hautala, 2006
Executives	67	66	44	33	67	82	18	66	33	Roach, 1986 [a]
Entrepreneurs, innovators, etc.	122	55.7	44.3	32.0	68.0	86.1	13.9	54.9	45.1	Reynierse *et al.* 2000
Management Consultants	150	58	42	33	66	62	38	59	41	Culp and Smith, 2001

Note: "E" = Extraversion, "I" = Introversion, "S" = Sensing, "N" = Intuition, "T" = Thinking, "F" = Feeling, "J" = Judging, "P" = Perceiving

[a] as cited in Gardner and Martinko, 1996.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 3.6: Importance ranks for each of ten value types from different populations

Value Type	**Students**					**Leaders & Executives & Managers**						
						Countries					Organization [f]	
	PMP [a]	54 Nations [b]	Spain [c]	Japan [d]	America [d]	Australia [e]	Japan [e]	China [e]	Russia [e]	Canada [f]	For-profit	Non-profit
Benevolence	**1**	**1**	3	4	**1**	**2**	4	**1**	3	3	3	3
Self-direction	**2**	**2**	**1**	**1**	4	3	**1**	6	**2**	**1**	**1**	**1**
Conformity	3	6	6	3	5	5	6	4	5	7	5	8
Hedonism	4	7	4	8	6	8	7	8	7	6	7	6
Achievement	5	4	5	**2**	**2**	**1**	**1**	3	4	**2**	**2**	4
Stimulation	6	8	8	6	7	7	8	7	9	8	8	7
Security	7	5	7	5	3	4	5	**2**	**1**	4	6	5
Universalism	8	3	**2**	**7**	9	6	3	5	6	5	4	**2**
Tradition	9	9	9	10	8	9	9	8	10	10	10	9
Power	10	10	10	9	10	10	10	10	8	9	9	10

Sources:

"**a**" = The present study; "**b**" = Schwartz and Bardi (2001); "**c**" = Ros and Grad (1991); "**d**" = Malone and Paik (2007); "**e**" = Sarros and Santo (2001), "f" = Egri and Herman (2000)

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

PMP Students' Value Types

The analysis of the PMP students' value types have been based on a total 63 PMP students and investigated in terms of:

- the PMP students' value ranks and its comparison with other samples.

Value Ranks

In order to identify the value ranks of the PMP students, means have been calculated and rank ordered (from highest to lowest). This data is illustrated in Table 3.6 together with the value hierarchies of other samples[2].

The PMP students, on average, ranked "benevolence" as their top priority value type and "self-direction" as their second. The lowest rated values were "tradition" and "power."

Comparison with Other Samples

"Benevolence" and "self-direction" were also the most important values in the student sample from 54 nations. Similarly, "benevolence" appeared to be the paramount value for the American students and "self-direction" seemed to be one of the most important values for Spanish and Japanese students.

PMP students differed from the Spanish ones in terms of importance give to "universalism" value; this value ranked 2nd for the Spanish student sample, but for the PMP students it ranked 8th among the other ten values.

PMP students differed from Japanese and American students in terms of the importance given to "achievement" and "hedonism" values. "Achievement" was very important for Japanese and American students (ranked 2nd) but it seemed not to be so important for the PMP students (ranked 5th). "Hedonism" was a rather important value for the PMP students (ranked 4th) but Japanese students did not put so much importance on this value (ranked 8th).

PMP students and leaders from different countries and organizations seemed to be similar in terms of the importance given to the "benevolence" and "self-direction" values. Most remarkable differences between PMP students and

[2] See Appendix 3A-3 for the means and the standard deviations for the value types for each sample.

ISBN:978-84-693-5423-0/DL:T-1414-2010

leaders were the "achievement" and "hedonism" values. Leaders registered high mean scores on "achievement" and low scores on "hedonism" value.

It can be seen from Table 3.6 that "tradition" and "power" had the lowest mean scores across all the samples.

Summary

The general characteristics of the PMP students are summarized in Table 3.7 according to their academic eligibility, motivation to lead and their primary Belbin role preferences.

It can be observed that of the 16 "shaper" students, 13 of them met the requirements of academic eligibility. However, of these 13 shapers three of them did not want to take on the leadership role.

Two of the four "coordinator" students met the academic requirements and they were motivated to take on the leadership role.

Following the same logic in Table 3.7, Table 3.8 summarizes the students' characteristics according to their perceived managerial styles. Looking at the students with "authoritative" style ($N_T = 10$), eight of them were academically eligible (75%), and of these eight students, six of them were motivated to lead the teams. There were two students with "coaching" style, both had the motivation, but only one of them was academically eligible. It also worths noting that all the four students who had "democratic" style possessed the academic eligibility and the motivation to take on the leadership role.

When the students' MBTI types are examined (Table 3.9) it became apparent that all the INTJ (N=4), ENTJ (N=3), and INFJ (N=1) students were academically eligible. Interestingly, all the INTJs were motivated to lead as well. One ENTJ, however, did not want to take this responsibility. Of the sixteen ISTJs, most of them were academically eligible (N=14), however more than the half of them did not want to become team leaders (N=8). The majority of the academically-not-eligible ESTJs were not motivated to lead either (5 out of 8). On the other hand, the majority of the academically eligible ESTJs were also motivated to lead (9 out 12).

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 3.7: Summary characteristics of the PMP students according to their academic eligibility, motivation to lead, and primary team roles

Eligibility			Students' Primary Belbin Team Role Preferences									Total
			SH	CO	CF	PL	TW	RI	ME	IMP	Mixed	
Not eligible	Motivation	No motivation	1	0	2	0	1	1	0	1	1	7
		Has motivation	2	2	1	1	1	0	2	1	0	10
	Total		3	2	3	1	2	1	2	2	1	17
Eligible	Motivation	No motivation	3	0	4	1	3		2	2	1	16
		Has motivation	10	2	5	2	2		1	4	4	30
	Total		13	2	9	3	5		3	6	5	46

Table 3.8: Summary characteristics of the PMP students according to their academic eligibility, motivation to lead, and perceived managerial styles

Eligibility			Students' Perceived Managerial Styles							Total
			Coercive	Authoritative	Affiliative	Democratic	Pacesetting	Coaching	Mixed	
Not eligible	Motivation	No motivation	0	1	4		2	0	0	7
		Has motivation	1	1	1		4	1	2	10
	Total		1	2	5		6	1	2	17
Eligible	Motivation	No motivation	2	2	4	0	3	0	5	16
		Has motivation	2	6	11	4	2	1	4	30
	Total		4	8	15	4	5	1	9	46

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 3.9: Summary characteristics of the PMP students according to their academic eligibility, motivation to lead, and MBTI types

Eligibility			MBTI											Total
			ISTJ	ISFJ	INFJ	INTJ	ISTP	ESTP	ENFP	ENTP	ESTJ	ESFJ	ENTJ	
Not eligible	Motivation	No motivation	0	0			0	0	0	1	5	1		7
		Has motivation	2	1			1	1	1	1	3	0		10
	Total		2	1			1	1	1	2	8	1		17
Eligible	Motivation	No motivation	8	1	1	0	0	1	0	0	3	1	1	16
		Has motivation	6	0	0	4	4	2	1	1	9	1	2	30
	Total		14	1	1	4	4	3	1	1	12	2	3	46

UNIVERSITAT ROVIRA I VIRGILI
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3.1.2. ANALYSES OF THE CHARACTERISTICS OF THE SELECTED LEADER STUDENTS

A total of 24 leader students were selected from two consecutive academic years; 11 leaders in the 2007-2008 academic year and 13 leaders in the following one. This sample, in both academic years, was made up of nearly equal number of female and male leader students (Table 3.10).

Table 3.10: Frequency distribution of the selected leader students by gender and by academic year

			Gender		
			Male	Female	Total
Academic Year	2007-2008	Frequency	5	6	**11**
		% within Academic Year	45.5	54.5	100.0%
	2008-2009	Frequency	7	6	**13**
		% within Academic Year	53.8%	46.2	100.0%
	In General	Frequency	12	12	**24**
		% within Academic Year	50.0%	50.0%	100.0%

The personality profile of each selected leader student is presented in Table 3.11 in terms of their team role preferences, perceived managerial styles, MBTI types, and high and low priority values.

The frequency distribution of the **leader students' primary Belbin team role preferences** is shown by the pie-chart in Figure 3.8. The gray sectors represent those leader students who did not have a primary preference for a "leader" role, either shaper or coordinator (N =12). The sections in color highlight the ones who had a clear primary preference for a "leader" role (N = 12). It can be seen that the number of students with and without a "leader" role preference was equal. It was interesting also to observe that the roles of monitor evaluator and resource investigator were not the primary role preferences for any of the leader students.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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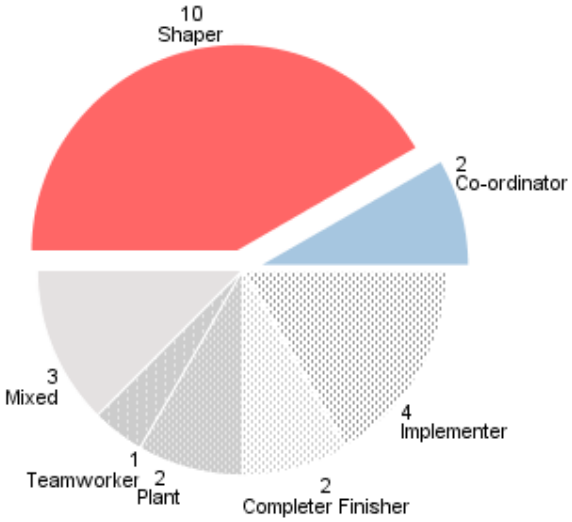
Table 3.11: The personal profile of selected leader students

Academic Year	Leaders	Belbin's Team Roles		Perceived Managerial Styles		MBTI	Values	
		Primary	Secondary	Primary	Secondary		Highest	Lowest
2007-2008	L1	Shaper	Completer finisher	Authoritative	Coercive	ISTJ	Benevolence / Conformity	Power / Hedonism
	L2	Shaper	Implementer	Authoritative	AFF/PCS	ESTJ	Achievement / Conformity	Benevolence / Tradition
	L3	Implementer	Coordinator	Democratic	Coercive	ESTJ	Conformity / Self-direction	Hedonism / Power
	L4	Shaper	Implementer	Coercive	Affiliative	ISTJ	Benevolence / Conformity	Stimulation / Power
	L5	Shaper	Coordinator	Affiliative	DEM/COE	ESTP	Stimulation / Achievement	Tradition / Security
	L6	Implementer	Teamworker	Affiliative	Coaching	ISTJ	Hedonism / Conformity	Stimulation / Power
	L7	Shaper	Coordinator	Pacesetter	Coercive	ESTJ	Hedonism / Benevolence	Tradition / Power
	L8	Completer finisher	Teamworker	Affiliative	Authoritative	ISTP	Hedonism / Achievement	Power / Universalism
	L9	Plant	Coordinator	Pacesetter	Authoritative	INTJ	Self-direction / Hedonism	Tradition/Security
	L10	Shaper	CO/PL/TW	DEM/AFF	COE/AUT	ESTP	Hedonism / Self-direction	Power/Universalism
	L11	Teamworker	SH/RI	Affiliative	Pacesetter	ISTJ	Benevolence / Universalism	Tradition/Power
2008-2009	L12	Shaper	Implementer	Democratic	COA/AUT	ENTJ	Hedonism / Achievement	Tradition / Power
	L13	Shaper	Coordinator	Affiliative	Authoritative	ENTP	Stimulation / Achievement	Tradition / Security
	L14	CO/CF	IMP/RI	Affiliative	Coercive	ESTJ	Conformity / Hedonism	Tradition / Universalism
	L15	Completer finisher	Shaper	Authoritative	Pacesetter	INTJ	Conformity / Benevolence	Stimulation / Hedonism
	L16	Coordinator	Shaper	Democratic	AUT/PCS	INTJ	Benevolence / Hedonism	Conformity / Security
	L17	Coordinator	Implementer	Coaching	Authoritative	ESTJ	Achievement / Tradition	Hedonism / Stimulation
	L18	Implementer	Shaper	Coercive	Affiliative	ESTJ	Stimulation / Hedonism	Power / Tradition
	L19	IMP/SH	Completer finisher	AUT/AFF/CO	COE/PCS	ISTJ	Benevolence / Conformity	Power / Selfdirection
	L20	Shaper	Implementer	Authoritative	Pacesetter	INTJ	Achievement / Hedonism	Tradition / Power
	L21	Implementer	Coordinator	Authoritative	COE/AFF/DEM	ESTJ	Hedonism / Self-direction	Tradition / Conformity
	L22	Shaper	Monitor evaluator	Affiliative	Democratic	ESTJ	Achievement / Stimulation	Tradition / Power
	L23	Plant	Shaper	Affiliative	Coercive	ISTP	Achievement / Self-direction	Tradition/Security
	L24	CO/SH	IMP/ME	COE/AFF	AUT/PCS	ESTJ	Hedonism	Tradition/Power

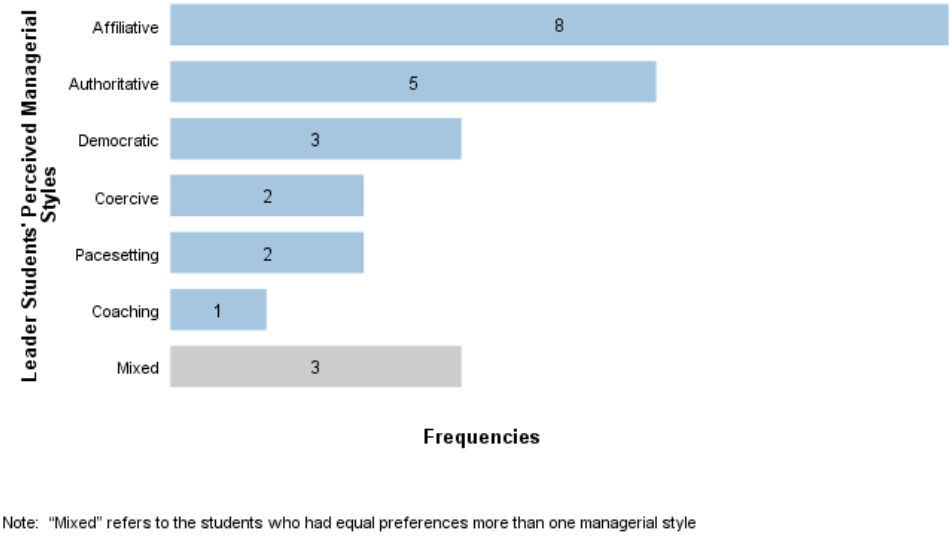
Note: "CO" = Coordinator, "CF" = Completer finisher, "PL" = Plant, "SH" = Shaper, "RI" = Resource Investigator, "IMP" = Implementer, "DEM" = Democratic, "AFF" = Affiliative, "COE" = Coercive, "PCS" = Pacesetter



Note: As shown in Table 3.11 mixed leaders are L14-19-24

Figure 3.8: Frequency distribution of the selected leader students' Belbin primary team role preferences ($N_T = 24$)

The frequency distribution of the leader students' **perceived dominant managerial styles** is illustrated in Figure 3.9. The most frequent managerial styles were "affiliative" and "coercive" and the least frequent ones were "pacesetting" and "coaching" styles.



Note: "Mixed" refers to the students who had equal preferences more than one managerial style

Figure 3.9: Frequency distribution of the selected leader students' perceived managerial styles ($N_T = 24$)

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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The distribution of leader students' MBTI types is summarized in Table 3.12. It can be observed that the leaders were mainly ESTJs and ISTJs. Here, it worths noting that this sample was mainly composed of Ts (thinkers) and Js (judgers) and there weren't any students with preferences for "feeling".

Table 3.12: Frequency and percent of MBTI types for the selected leader students (N=24)

ISTJ 5 20.8%	**ISFJ** 0 0%	**INFJ** 0 0%	**INTJ** 4 16.7%
ISTP 2 8.3%	**ISFP** 0 0%	**INFP** 0 0%	**INTP** 0 0%
ESTP 2 8.3%	**ESFP** 0 0%	**ENFP** 0 0%	**ENTP** 1 4.2%
ESTJ 9 37.5%	**ESFJ** 0 0%	**ENFJ** 0 0%	**ENTJ** 1 4.2%

The frequency distribution of the leader students' top priority values is illustrated in Figure 3.10. It is evident from this figure that most frequently the leader students hold "hedonism" as their most important value type which was followed by "achievement" and "benevolence".

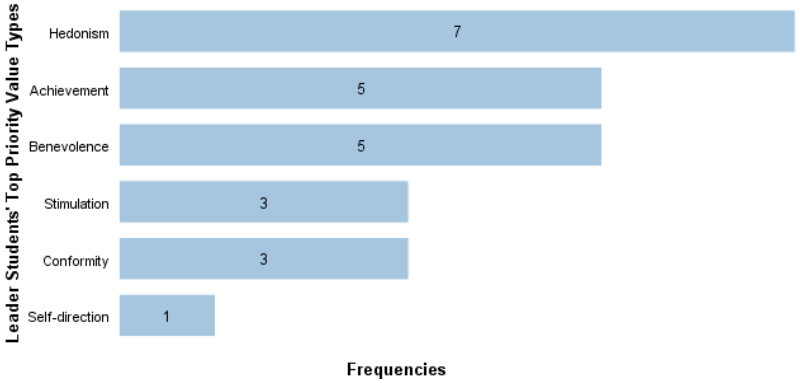

Figure 3.10: Frequency distribution of the selected leader students' most important value types ($N_T = 24$)

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The mean and standard deviations of the leader students' preferences on eight team roles, six managerial styles, 4 MBTI scales, and ten value types are presented in Appendix 4A-5, Appendix 4A-6, Appendix 4A-7, and Appendix 4A-8 respectively.

3.2. THE CRITICAL INCIDENTS ENCOUNTERED AND THE LEADERSHIP BEHAVIORS SHOWN

This section consists of 2 subsections (Figure 3.11). The first one provides the results concerning the type of the critical events encountered by the leader students and the second one reports on the leadership behaviors shown by the leader students.

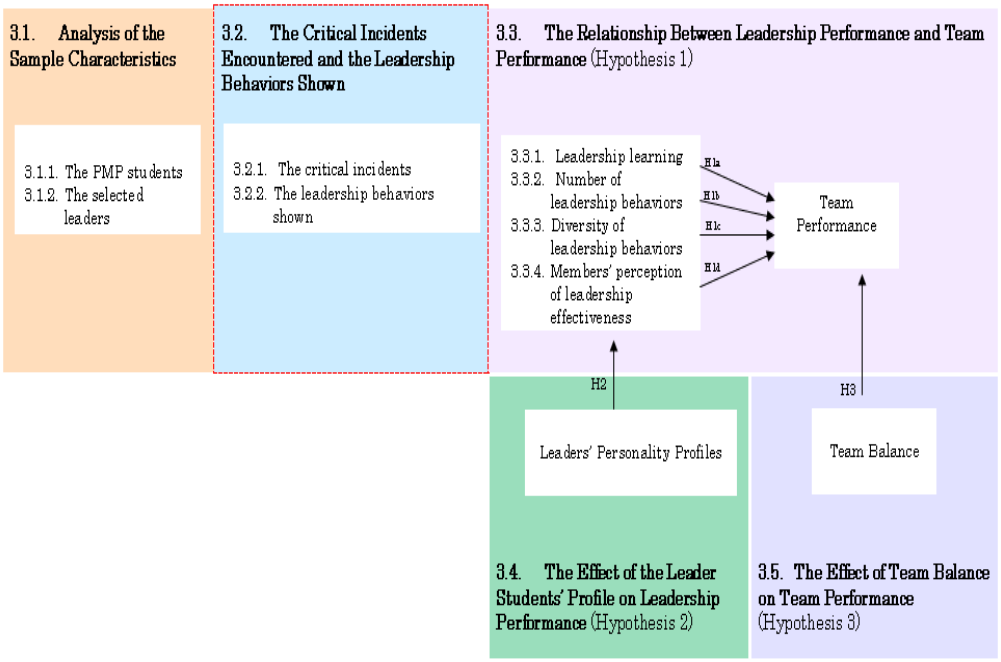

Figure 3.11: Schematic view of Section 3.2 in the results section

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3.2.1. THE CRITICAL EVENTS ENCOUNTERED BY THE TEAM LEADER STUDENTS AS IDENTIFIED IN THE BEIs

The critical events described by the 11 leaders from 2007-2008 academic year during their behavioural event interviews have been content analysed to identify the critical events encountered by the leader students in their leadership role.

The descriptive data associated with the BEIs are shown in Table 3.13. On average, an interview lasted for 46.45 minutes (SD = 9.11). The eleven leader students described a total of 60 critical work events.

Table 3.13: Descriptive statistics for the leader students' BEIs

	# of leader student	Sum	M	SD	Min.	Max.
Length (minutes)	11	510.91	46.45	9.11	27.16	59.48
Number of critical events explained by the leader students	11	60	5.45	1.13	4	8
Number of critical incidents reminded [a]	11	21	1.9	1.22	0	4

Note: "a" = in some incidents, when the leader students could not remember the work incidents, the interviewee helped them to recall some of these incidents

Those 60 critical work incidents have been grouped according to the:

(a) academic semester they occurred,

(b) type of people involved (e.g. members, professors, etc.),

(c) type of the event (e.g. lack of member motivation, member underperformance).

Academic Semester for the Occurrence of the Critical Incidents

The results in Figure 3.12 demonstrate that the big majority of the critical incidents explained by the leader students happened in the first academic semester (N=54, accounting for the 90% of the events). The leaders

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described very few critical situations occurred in the 2nd semester (N=4, accounting for the 6.6% of the events).

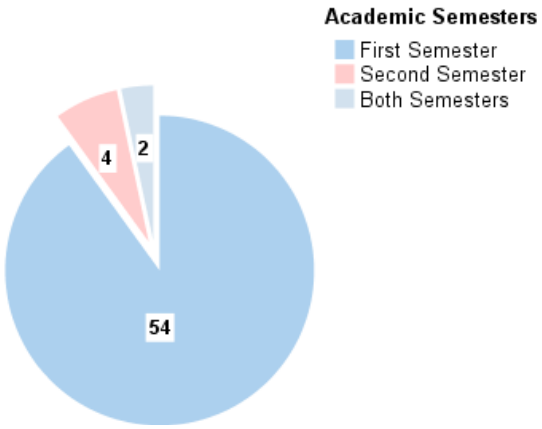

Figure 3.12: Pie chart demonstrating the distribution of the 60 critical events described in the BEIs according to the academic semester (in the 2007-2008 academic year, from 11 leaders)

Type of People Involved in the Critical Incidents

The type of people involved in those critical incidents is illustrated in Figure 3.13. For the most part, these critical events were associated with the team and its members. Some incidents were related to the, clients, professors and the coaches (N=14). Very few incidents were linked to another team leader (N=2).

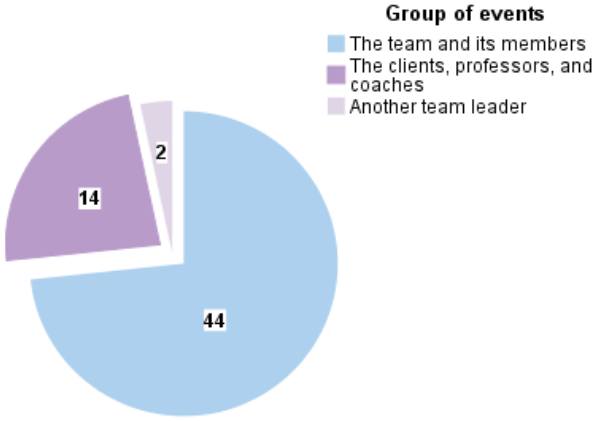

Figure 3.13: Pie chart demonstrating the distribution of the 60 critical events described in the BEIs according to the type of people involved

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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Critical Incidents Related to the Team Members

The critical incidents experienced by the leader students in relation to their team members varied in type and six common types of incidents have been identified (Figure 3.14)

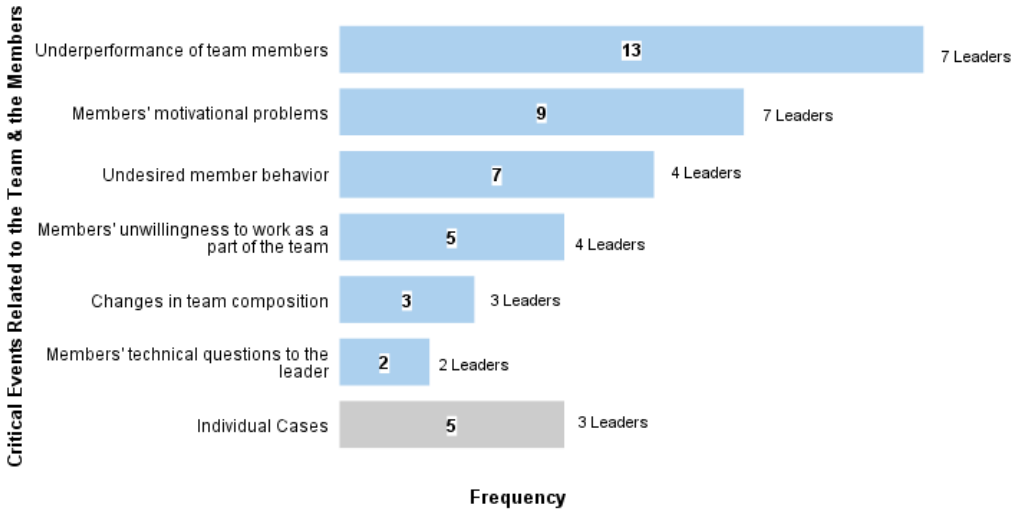

Figure 3.14: Bar diagram demonstrating the frequency distribution of the critical events experienced by team leaders in relation to the team and its members ($N_T = 44$). The number of leader students who experienced a similar incident is presented next to the bars.

Most frequently, the leader students were confronted with the problem of **members' underperformance** (N=13, experienced by seven leaders). Examples included procrastination on the project activities, low participation in the team meetings and low implication in the project.

The second most frequent incident concerning the team members was **members' motivational problems** (N=9, experienced by seven leaders). At the beginning of the project work, the leader students faced a certain lack of motivation and enthusiasm from the members who failed the project the year before (repeating members). In the continuation, the leaders experienced the problem of loss of "member motivation" due to increased workload in the project.

The third most frequent incident associated with the members was their **undesired behaviors** (N=7, experienced by four leaders). The leaders needed to deal with the members who did not show up at the meetings or confront the ones

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who came but distracted the meeting, for example, by laughing or by speaking about non-work related topics.

Another frequent critical incident about team members was their **unwillingness to work as a part of the team** (N=5, experienced by four leaders). For example, some members knew each other before joining the team and they did not get along then, so they did not want to work together on the project activities or some members preferred working alone over working with their respective activity mates.

It was not quite frequent but still few leaders were challenged with the **changes in the team compositions** (N=3, experienced by three leaders) because in some teams a pair of members decided to quit the project and in turn the team. In another occasion, new members were integrated to a team. In both versions, the leaders were confronted with the difficulty of explaining to the team members the positive outcomes of the change that was happening in the team.

The last type of incident related to the team members was **members' technical questions to the leader** (N=2, experienced by two leaders). The leaders found difficulty in answering members' technical questions either because they did not know the right answer or they did not have enough time to dedicate to answer all the members' questions. There were 5 critical incidents that were separate and could not be grouped under any of the other six types of incidents related to the members.

Critical Incidents Related to the Clients, Professors, and the Coaches

The leaders experienced incidents with **the clients** because:

- Some clients arranged unexpected exams (which were not included in the planning therefore inversely impacted the team members).
- One client changed her/his mind regarding what s/he wanted from a project activity.
- One client gave very low grades in poster session in comparison to the other clients.
- One client refused to explain an activity.
- One leader did not agree with one client's point of view.

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

- The clients' point of view regarding how to manage the projects differed from the one of the PMP professors.

The incidents with the **professors** were experienced because:

- Two leaders were in the opinion that they were not well treated during the oral presentations.
- One leader did not share the same opinion with a professor with respect to how s/he led the team.
- One point was subtracted from a leader's final grade.
- A leader received a grade lower than s/he expected.
- A leader did not agree with the PMP course evaluation with respect to attending the class.

The incidents with the **coaches o**ccurred because:

- A leader student did not agree with her/his coach to apply every technique taught in the PMP course.
- Another leader did not agree with the feedback provided by her/his coach.

In short, the critical incidents with the clients occurred mainly because of the changes in clients' plans, requirements, etc. The incidents with the professors and the coaches were experienced, in general, because of the different points of view between those and the leader students.

3.2.2. LEADERSHIP BEHAVIORS SHOWN BY THE LEADER STUDENTS

The learning journals and the behavioral event interviews of the eleven leader students from the 2007-2008 academic year have been coded against the Competency Dictionary Alabart (Alabart *et al.*, 2008c) to identify the leadership behaviors shown by the those students.

For each leader student, Appendix 4B and 4C presents the behaviors identified in the journals and in the behavioral event interviews respectively.

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Those leadership behaviors shown by the students have been investigated in terms of:

(a) Their occurrence across academic semesters

(b) The proficiency levels to which they belonged to

(c) The competence to which they belonged to

(d) Their frequency (highest frequency)

The descriptive data regarding the learning journals and the behavioral event interviews (BEIs) are presented in Table 3.14.

Table 3.14: Descriptive statistics for the leader students' learning journals and BEIs

	N	Sum	M	SD	Min.	Max.
Length (pages)	11	126	11.45	5.2	6	22
Number of entries made	11	294	26.73	12.11	14	60
Number of entries coded	11	254	23.09	8.37	8	41
Total number of leadership behaviors identified in the learning journals	11	1280	116.36	92.85	14	354
Total number of leadership behaviors identified in the behavioral event interviews	11	273	25.00	19.35	4	80

Note: Journal lengths were standardized by using the same font and size (times new roman 11, single spacing)

The total length of learning journals was 126 pages; the longest journal was 22 pages and the shortest was 6 pages. Eleven leader students in total made 294 entries to their journals in which 254 of them (86.34%) leadership behaviors have been identified. In the remaining 40 entries, no effective leadership behaviors have been identified. The leadership behaviors identified in the learning journals summed a total of 1280. The maximum number of behaviors identified in a learning journal was 354 and the minimum was 14.

In the BEIs, a total of 273 leadership behaviors have been identified. The maximum number of behaviors identified in a BEI was 80 and the minimum was 4.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The Occurrence of the Leadership Behaviors in Two Academic Semesters

The mean number of leadership behaviors identified in the learning journals of leader students is illustrated in Figure 3.15 according to the weeks of journal writing activity.

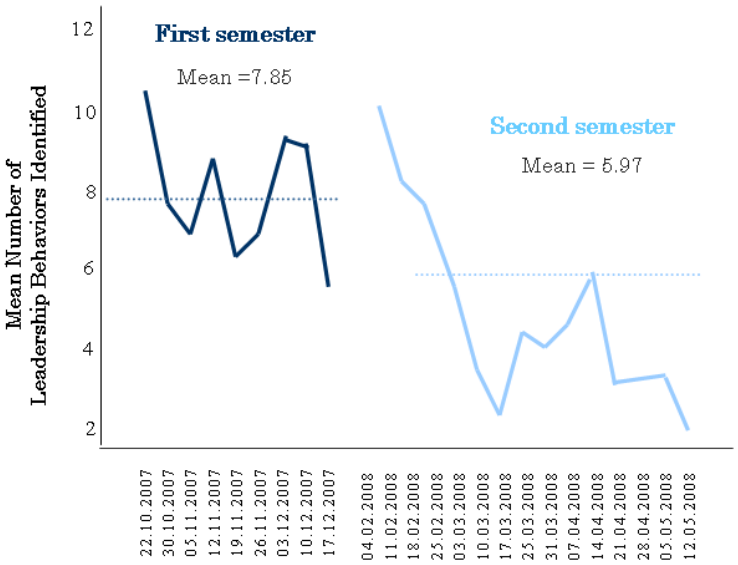

Figure 3.15: The mean number of leadership behaviors identified in the learning journals of the eleven leader students according to the 24 weeks of journal writing activity

The highest mean numbers of leadership behaviors have been identified in the beginning of the first and the second academic semester.

The mean number of leadership behaviors identified in the first semester (M = 7.85, SD = 8.78) seemed to be higher than the second one (M = 5.97, SD = 6.38). However, no statistically significant differences were found between these two (See Appendix 4D-1 for the results).

The Proficiency Levels of the Shown Behaviors

The proficiency levels of the leadership behaviors identified in the learning journals and in the behavioral event interviews are shown in Figure 3.16. In both research tools, the majority of the identified leadership behaviors were at level 2; team leadership level.

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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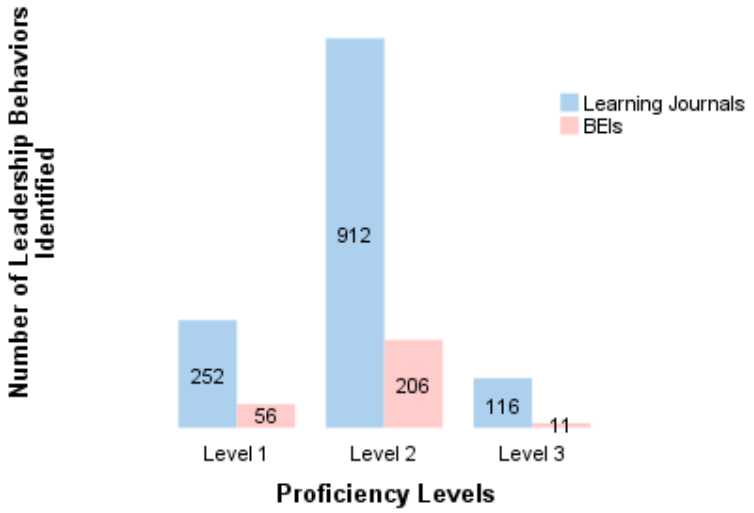

Figure 3.16: Distribution of the number of the leadership behaviors identified in the learning journals and in the behavioral event interviews across the three leadership proficiency levels (N_T = 1280for learning journals, N_T = 273 for the BEIs).

The Competences Shown at Team Leadership Level (level 2)

The leadership behaviors in the learning journals and in the BEIs have been most frequently observed at the team leadership level. At this proficiency level, the competences to which the identified behaviors belonged to have been investigated. The results are presented in Figure 3.17 and 3.18 for learning journals and BEIs respectively in descending order. In both tools, **the most frequently identified** competences were:

- "teamwork",
- "commitment to learning",
- "interpersonal communication", and
- "results orientation"

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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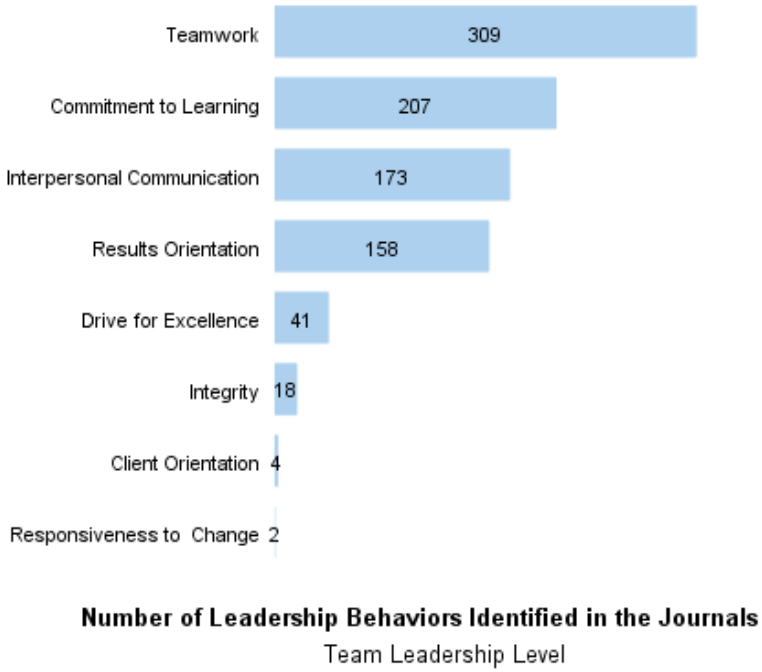

Figure 3.17: The leadership competences identified in the learning journals at level 2 (team leadership level, $N_T = 912$)

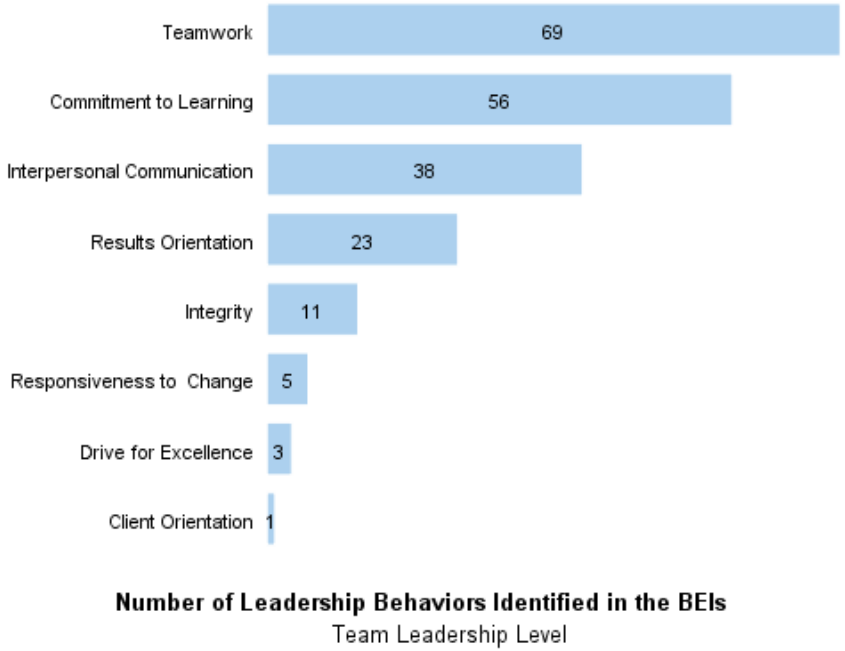

Figure 3.18: The leadership competences identified in behavioral event interviews at level 2 (team leadership level, $N_T = 206$)

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ISBN:978-84-693-5423-0/DL:T-1414-2010

The **least frequently identified** competences were "drive for excellence", "integrity", "client orientation", and "responsiveness to change".

- "drive for excellence"
- "integrity",
- "client orientation", and
- "responsiveness to change"

The high number of behaviors identified in the "teamwork" competence is understandable in the sense that one of the prime responsibility of leader students is to build the teams. In fact, it has been demonstrated that most frequently leader students faced critical situations in which they needed to solve members' motivational problems and their unwillingness to work as a part of the team.

The high number of behaviors identified in the "commitment to learning" competence probably explains the realization of one other major responsibility of the leader students; that is to develop the first year students.

It was interesting to see that the "drive for excellence" competence was not observed so frequently in leaders' journals or BEIs. The low number of the behaviors identified in the "client orientation" competence implies the need to put more emphasis on the development of this competence. The low number of the behaviors identified in the "responsiveness to change" competence makes sense as continuous changes in general do not happen in design projects.

The Most Frequently Identified Behaviors at the Team Leadership Level

The behaviors observed most frequently in the learning journals and in the behavioral event interviews are presented in Table 3.15.

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Table 3.15: The top 5 behaviors that were shown at level 2 in the learning journals and in the behavioral event interviews (the competence that the behavior belonged to are shown in parentheses)

Learning Journal		Behavioral Event Interview	
Behavior	Frequency	Behavior	Frequency
Demonstrates caring leadership *(TW)*	123	Demonstrates caring leadership *(TW)*	26
Understands others' underlying needs, interests and problems *(IC)*	114	Understands others' underlying needs, interests and problems *(IC)*	25
Provides a balanced view of members' strengths and weaknesses *(CL)*	102	Provides a balanced view of members' strengths and weaknesses *(CL)*	26
Manages performance *(RO)*	65	Is committed enlisting support for team members *(CL)*	11
Is committed enlisting support for team members *(CL)*	44	Creates an atmosphere of mutual trust, confidence, and respect *(TW)*	10

Note: "TW" = Teamwork, "IC" = Interpersonal Communication, "CL" = Commitment to Learning, "RO" = Results Orientation

Again, the two instruments yielded almost identical results. The behaviors common to both tools were: "demonstrates caring leadership", "understands others' underlying needs, interests, and problems", "provides a balanced view of the members' strengths and weaknesses", "is committed enlisting support for team members". (See Appendix 4D-2 and 4D-3 for the whole list).

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

3.3. THE RELATIONSHIP BETWEEN LEADERSHIP PERFORMANCE AND TEAM PERFORMANCE

This section reports on the statistical results of the relationship between leadership performance and team performance (Figure 3.19). Leadership performance has been assessed in terms of four variables:

- Leadership learning
- Number of leadership behaviors
- Diversity of leadership behaviors
- Members' perception of leadership effectiveness

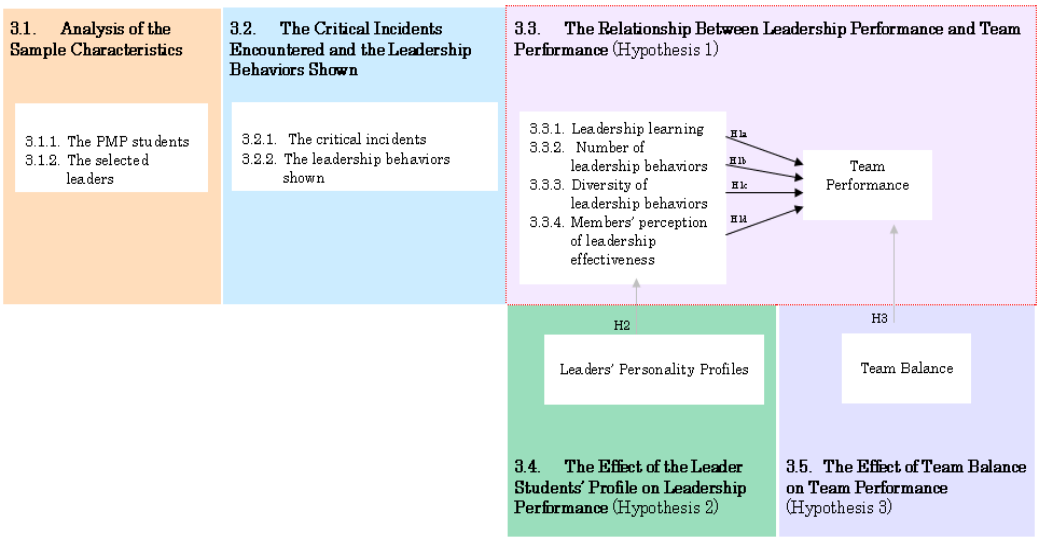

Figure 3.19: Schematic view of Section 3.3 in the results section

Leadership learning has been determined by the leader students' final PMP grades. The **number and the diversity of leadership behaviors** have been identified by coding the leadership behaviors in leader students' learning journals and behavioral event interviews and have been examined at three leadership proficiency levels: level 1 (leadership without title), level 2 (team leadership), level 3 (organizational leadership). **Members' perception of leadership effectiveness** has been obtained for each leader by calculating the average member ratings on the eight leadership competences assessed in the 360-degree feedback process.

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Bivariate correlation analyses have been performed to test the hypothesized relationships. Prior to running correlation analyses the assumption of normal distribution has been checked for study variables (See Appendix 4D-4). Transformations have been applied to non-normally distributed variables to normalize the distribution. For the variables that the transformations did not improve the normality of data, Spearman's rank correlation coefficients have been reported. The sample was the 10 leader students from the 2007-2008 academic year.

Relationship between Leadership Learning and Team Performance

Pearson bivariate correlation test has been used to examine the research hypothesis that there would be a positive relationship between student leaders' learning of leadership and team performance (H1a). The resulting scatterplot is presented in Figure 3.20 to appoint the connection between the two variables.

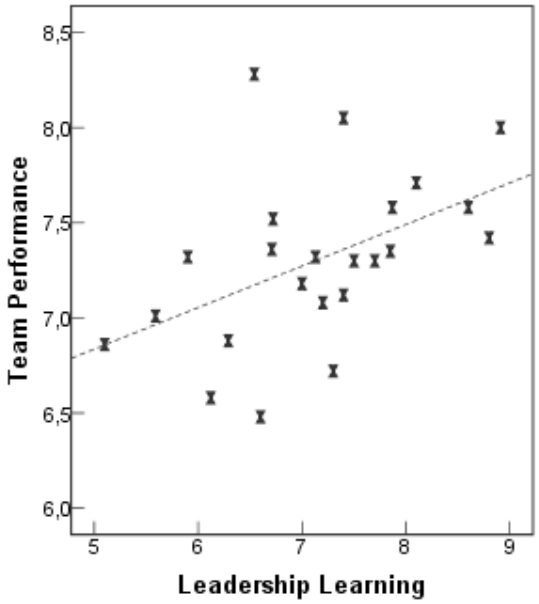

Figure 3.20: Scatterplot with linear regression curve (dashed line) for the relationship between leadership learning and team performance (N = 23, $R^2 = 0.23$)

The results indicate a moderate, positive, and significant correlation (medium effect size) between leadership learning and team performance (r = 0.48, $p < 0.05$, one-tailed), thus providing evidence in the support of H1a.

This finding is in agreement with the study of Hirst *et al.* (2004) who found a significant positive correlation between leadership learning and customer ratings of team performance ($r = 0.36$, $p < 0.05$). In their study, the correlation between these two variables was also moderate and significant at the 0.05 level.

Relationship between the Number of Leadership Behaviors and Team Performance

Pearson correlation coefficients have been computed to assess the association between the number of leadership behaviors shown and the team performance (H1b). The results are presented in Table 3.16. Due to the few number of leadership behaviors identified in the BEIs at level 3, this variable has been excluded from the correlation analysis.

Table 3.16: Pearson correlation coefficients for the relation between the numbers of leadership behaviors identified in learning journals and in BEIs at different proficiency levels and team performance. Associated significance values are presented in parenthesis (N=10)

Number of leadership behaviors identified in		Team Performance	
Learning journals	Level 1	0.44	(0.10)
	Level 2	**0.60***	(0.03)
	Level 3	0.45	(0.10)
BEIs	Level 1	0.29	(0.21)
	Level 2	**0.58***	(0.04)

Note: * significant at $p < 0.05$, one-tailed, **Bold** characters represent statistically significant correlations, "Level 1" = Leadership without title, "Level 2" = Team leadership, "Level 3" = Organizational leadership, "BEI" = Behavioral event interview

The most striking result to emerge from the above table is that the number of leadership behaviors identified at team leadership level had positive and significant correlations (large effect size) with team performance when both learning journals ($r = 0.60$, $p < 0.05$) and the BEIs ($r = 0.58$, $p < 0.05$) have been used; thus providing partial evidence in the support of H1b. These correlations are presented in Figure 3.21 and Figure 3.22 respectively.

UNIVERSITAT ROVIRA I VIRGILI
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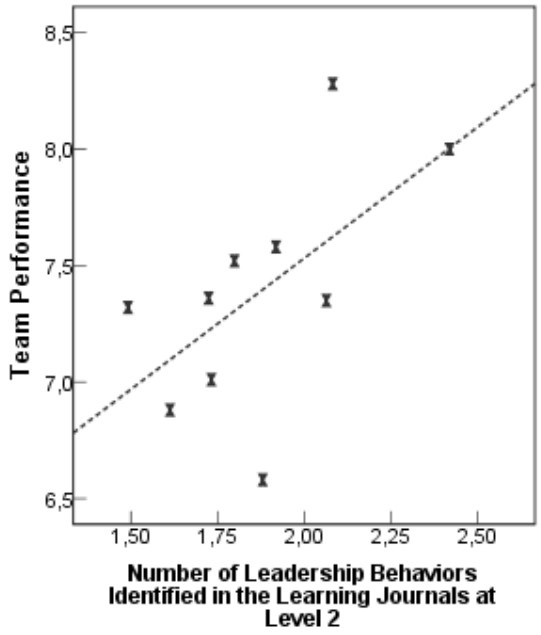

Figure 3.21: Scatterplot with linear regression curve (dashed line) for the relationship between the number of leadership behaviors identified in learning journals at level 2 and team performance (N = 10, R^2 = 0.36), number of behaviors log-transformed

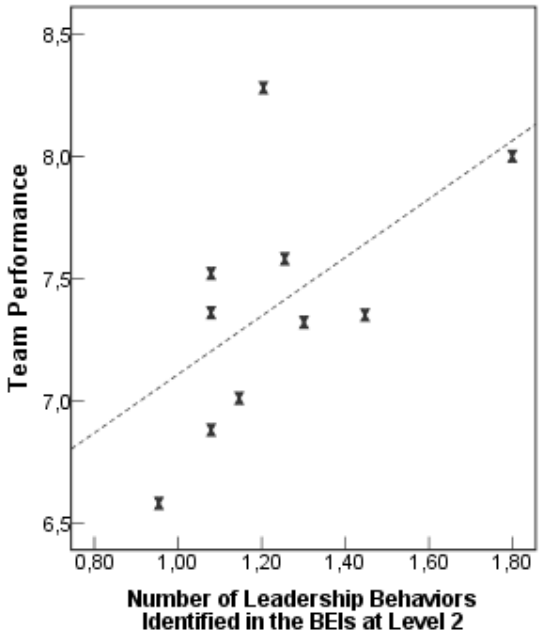

Figure 3.22: Scatterplot with linear regression curve (dashed line) for the relationship between the number of leadership behaviors identified in the BEIs at level 2 and team performance (N = 10, R^2 = 0.33), number of behaviors log-transformed

ISBN:978-84-693-5423-0/DL:T-1414-2010

The Relationship between the Diversity of Leadership Behaviors and Team Performance

Pearson and Spearman's correlation coefficients have been computed to test the relationship between the diversity of leadership behaviors and team performance (H1c). The results are displayed in Table 3.17. The diversity of leadership behaviors at level 3 has been excluded from the analysis due to few behaviors identified at this level.

Table 3.17: Correlation coefficients for the relation between the diversity of leadership behaviors identified in learning journals and in the BEIs at different proficiency levels and team performance. Associated significance values are presented in parenthesis (N=10)

Diversity of leadership behaviors identified in		Team Performance	
Learning journals	Level 1[a]	0.58	(0.05)
	Level 2[a]	**0.64***	(0.02)
BEIs	Level 1[b]	0.32	(0.18)
	Level 2[b]	**0.73****	(0.00)

Note: * significant at $p < 0.05$, ** significant at $p < 0.01$, one-tailed, "a" Pearson correlation coefficient, "b" Spearman's rank correlation coefficient, **Bold** characters represent statistically significant correlations, "Level 1" = Leadership without title, "Level 2" = Team leadership, "Level 3" = Organizational leadership, "BEIs" = Behavioral event interviews

There was a significant positive correlation (large effect size) between the diversity of leadership behaviors shown at level 2 and team performance. The same result has been obtained in both the learning journals ($r = 0.64$, $p < 0.05$) and the BEIs ($r_s = 0.73$, $p < 0.01$) whereas the correlation coefficient was larger in the latter case. These results provide partial evidence in the support of H1c. The resulting scatterplots for these significant correlations are presented in 3.23 and 3.24.

No statistically significant correlations have been detected between the diversity of leadership behaviors identified at level 1 and the team performance ($p > 0.05$ for both learning journals and the BEIs).

UNIVERSITAT ROVIRA I VIRGILI
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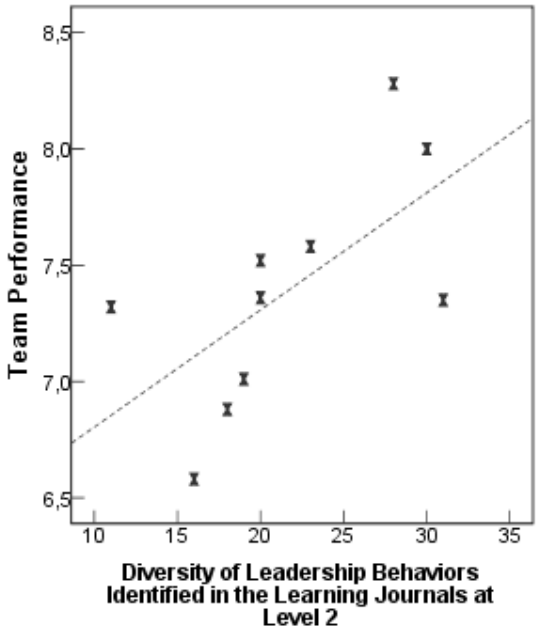

Figure 3.23: Scatterplot with linear regression curve (dashed line) for the relationship between the diversity of leadership behaviors identified in learning journals at level 2 and team performance (N = 10, $R^2 = 0.41$)

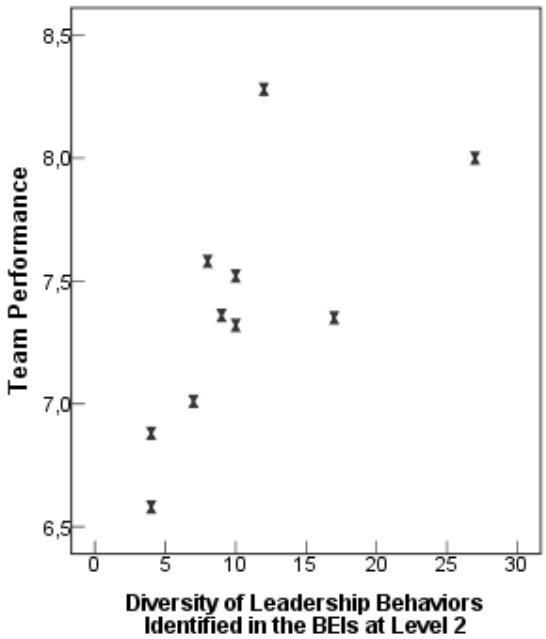

Figure 3.24: Scatterplot for the relationship between the diversity of leadership behaviors identified in the behavioral event interviews at level 2 and team performance (N = 10)

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The Relationship between the Members' Perception of Leadership Effectiveness and Team Performance

Pearson correlation coefficient has been computed to investigate the relationship between members' perception of leadership effectiveness and team performance (H1d), and the respective graph representing this relationship is presented in Figure 3.25.

There was a moderate positive significant correlation (large effect size) between the members' perception of leadership effectiveness and team performance ($r = 0.57$, $p < 0.05$). This finding supports the research hypothesis H1d.

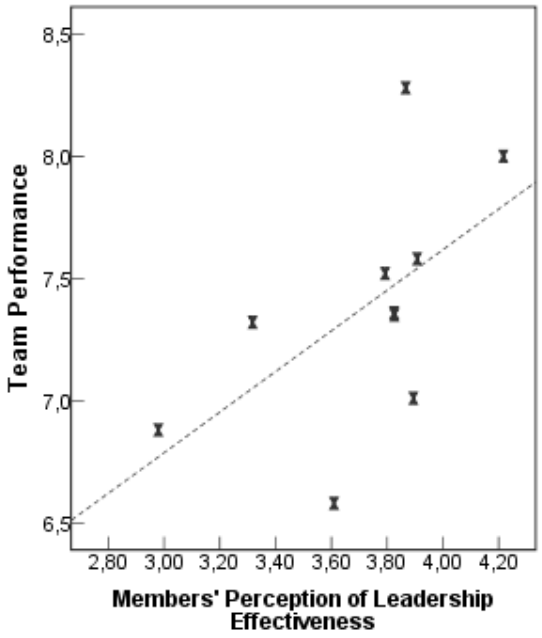

Figure 3.25: Scatterplot with linear regression curve (dashed line) for the relationship between the members' perception of leadership effectiveness and team performance (N = 10, $R^2 = 0.33$)

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Summary

The results from this section reveal that there was a significant positive correlation between the leadership performance of 4th student leaders and the performance of their integrated design project teams ($p < 0.05$). These results are summarized below.

Hypotheses	Positive relationship between:	Support
H1a	Leadership learning and team performance	√
H1b	Number of leadership behaviors and team performance	Partial For the behaviors shown at team leadership level
H1c	Diversity of leadership behaviors and team performance	Partial For the behaviors shown at team leadership level
H1d	Members' perception of leadership effectiveness and team performance	√

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

3.4. THE EFFECT OF THE LEADER STUDENTS' PERSONALITY PROFILE ON LEADERSHIP PERFORMANCE

This section reports on the results of the effect of leaders' personality profile on their leadership performance (Figure 3.26). Five different variables have been used to determine the leaders' personality profile:

- Belbin team role preferences
- Gender
- Perceived managerial styles
- MBTI types
- Higher order value types and hedonism value type

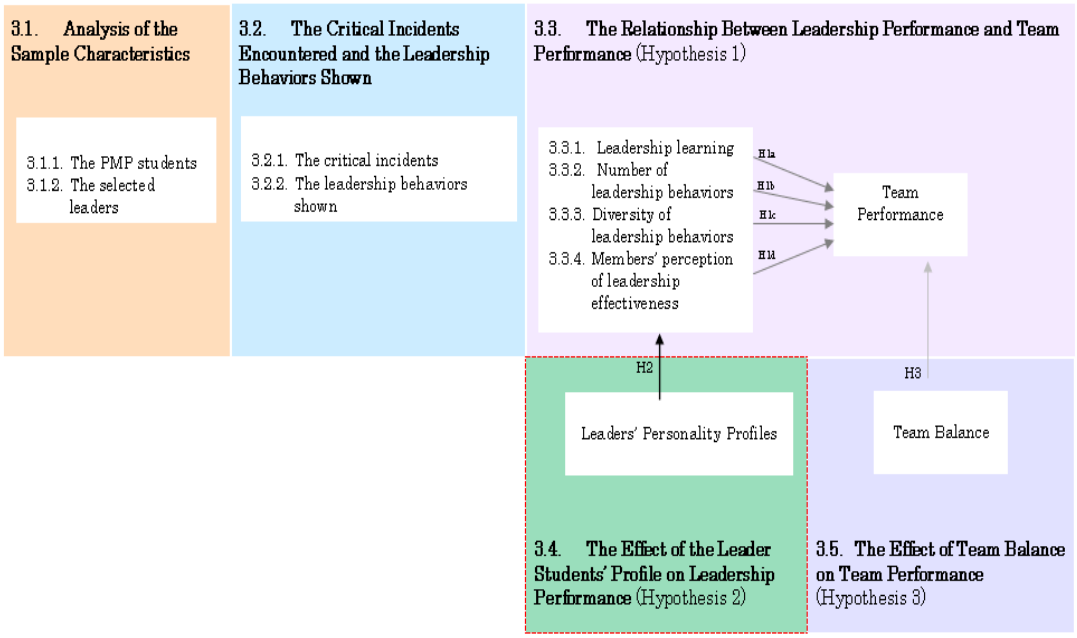

Figure 3.26: Schematic view of Section 3.4 in the results section

Of the above mentioned variables, the results regarding the effect of leaders' Belbin team role preferences on leadership performance have been

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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

presented in this section. The results concerning the effect of other four personality variables have been presented in Appendix 4E.

The leaders' Belbin team roles have been selected because of the eight roles suggested by Belbin (1981, 1993) two of them have been defined as the possible leader roles in a team: "shaper" and "coordinator".

Therefore, the first aspect of this section examines in particular whether having a primary role preference for a "leader role" ("shaper" or "coordinator") have an impact on leadership performance.

The second aspect, taking into account the preferences on all of the eight team roles, examines the type of leadership behaviors and competences exhibited by leaders with similar and different team role profiles.

3.4.1 THE EFFECT OF LEADERS' PRIMARY BELBIN TEAM ROLE PREFERENCES ON LEADERSHIP PERFORMANCE

This section tests the hypothesis that the leader students with a clear primary role preference for a "leader role" (either "shaper" or "coordinator") will demonstrate better leadership performance than those leader students who do not (who have preference for other roles). To this end, the leader students have been categorized into two groups as shown below.

(G1) Primary Belbin Leader Role Preference	Involves leader students with **a clear** primary preference for a team leadership role; either "shaper **or** "coordinator".
(G2) No Primary Belbin Leader Role Preference	Involves leader students with **no clear** primary preference for a leadership role; **neither "**shaper" **nor** "coordinator".

The size of the sample in each group (G1 and G2) is presented in Table 3.18 according to the leadership performance variable studied.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 3.18: Sample size according to the leadership performance variables studied

	Leadership performance variables	
	Leadership Learning	Leadership behaviors and members' perceptions
G1 (primary Belbin leader role)	12	6
G2 (no primary Belbin leader role	12	5
N_T	24	11

Note: "Leadership behaviors" refers to the number and diversity of leadership behaviors identified at level 2 in the learning journals and the behavioral event interviews; "members' perceptions" refers to the members' perception about leadership effectiveness

Therefore, for both leader category (G1 and G2) the means for leadership performance variables have been calculated. The results are displayed in Figure 3.27 and Figure 3.28.

It appears from the data in Figure 3.27 that the members' perception of leadership effectiveness did not vary too much between the two leader groups. However, leadership learning seemed to be higher in the group of leaders who had a "leadership role" preference (G1) than those who did not (G2).

Results in Figure 3.23 suggests that leader students who had a primary "leadership role" preference (G1), on average, tended to have higher number of and more diverse leadership behaviors at level 2 (as identified in learning journals and in the BEIs) than the leaders who did not have a "leadership role" preference (G2).

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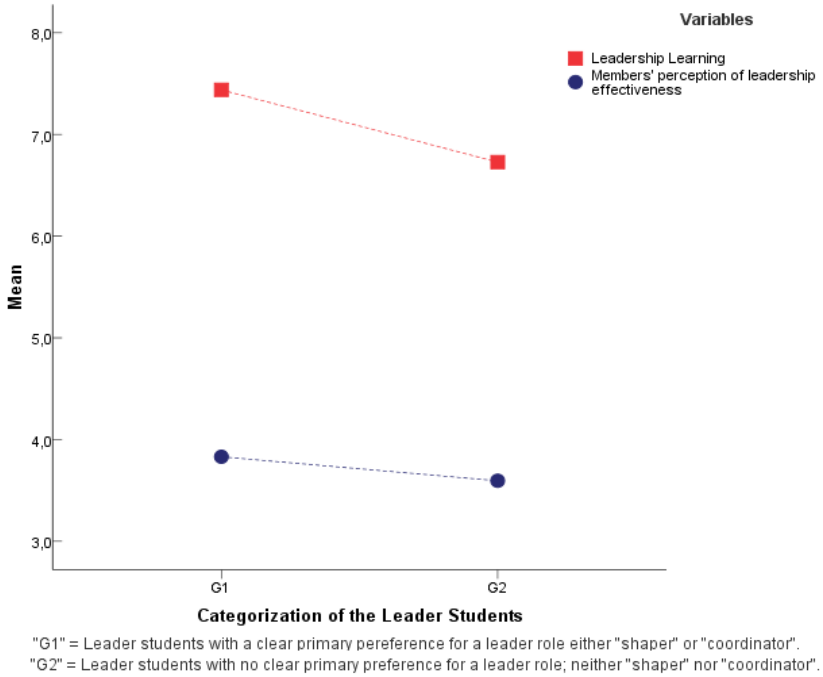

Figure 3.27: The mean leadership learning and member perception of leadership effectiveness for the 2 leader groups

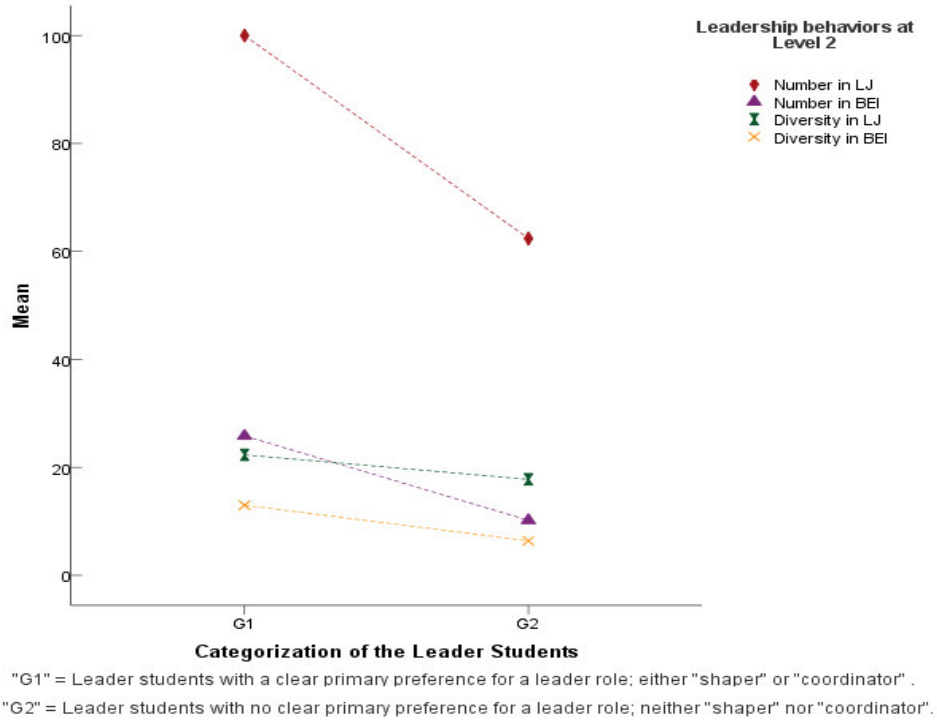

Figure 3.28: The mean number and diversity of leadership behaviors identified at level 2 for the 2 leader groups

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To determine whether these differences were significant, the student's t-test for independent samples has been used for normally distributed variables and the Mann-Whitney U-test for the non-normally distributed ones (See Appendix 4E-5 for the normality of the data). The results are presented in Table 3.19 and Table 3.20 respectively. The results demonstrate that:

√ On average, the leader students who had a clear primary preference for a "leadership role" (shaper or coordinator) **learned more leadership in the PMP course** (M = 7.44, SD = 0.92) than those leaders who had no leadership role preference (M = 6.73, SD = 1.01). This difference was **significant** $t(22) = 1.80$, $p < 0.05$ and it represented a medium sized effect $r = 0.36$, one-tailed.

√ On average, the leader students who had a clear primary preference for a "leadership role" demonstrated **significantly higher number of leadership behaviors** at team leadership level during the behavioral event interviews (Mdn = 8.00) than those leaders who had no leadership role preference (Mdn = 3.60), U = 3.00, $p < 0.05$ and it represented a large sized effect $r = 0.67$, one-tailed.

√ On average, the leader students who had a clear primary preference for a "leadership role" tended to demonstrate more leadership behaviors in the journals at team leadership level (M = 100, SD = 85.09) than the leaders who had no leadership role preference (M = 62.40, SD = 40.99). However, this difference was **not significant** $t(9) = 0.90$, $p > 0.05$, and it represented a small sized effect, $r = 0.29$, one-tailed.

√ On average, the leader students who had a clear primary preference for a "leadership role" tended to demonstrate more diverse leadership behaviors in the journals and in the BEIs at team leadership level than the leaders who had no leadership role preference. However, these differences were **not significant**, $p > 0.05$.

Table 3.19: Means, standard deviations, test of homogeneity of variances (Levene's Test), and the results of t-test for equality of leadership performance variable means according to two groups of leader students

Variables	Groups	*M*	*SD*	Levene's Test for equality of variances		T-test for equality of means		
				F	*Sig.*	t	*df*	*Sig.*
Leadership Learning	G1	7.44	0.92	0.16	0.69	1.80	22	**0.04***
	G2	6.73	1.01					
Number of behaviors in LJ at level 2	G1	100	85.09	1.32	0.28	0.90	9	0.20
	G2	62.40	40.99					
Diversity of behaviors in LJ at level 2	G1	22.33	7.47	0.05	0.83	1.00	9	0.17
	G2	17.80	7.56					
Diversity of behaviors in BEI at level 2	G1	13.00	7.72	1.48	0.26	1.69	9	0.06
	G2	6.40	4.34					
Members' perception effectiveness	G1	3.83	0.29	0.28	0.61	1.21	9	0.26
	G2	3.60	0.36					

Note: one-tailed significance value are reported; * significant at $p < 0.05$, "G1" = Leaders with a clear preference for a leadership role, "G2" = Leader who had no clear primary preference for a leadership role

Table 3.20: Results of Mann-Whitney U test

Variable	Groups	Median	Mann-Whitney U	Z	Exact *Sig.*	*r*
Number of behaviors in the BEIs	G1	8.00	3.00	-2.21	**0.02**	0.67
	G2	3.60				

Note: one-tailed significance value are reported

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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3.4.2. LEADERSHIP BEHAVIORS AND COMPETENCES ACCORDING TO THE LEADER STUDENTS' BELBIN TEAM ROLE SIMILARITIES

Eleven leader students' similarity on their eight team roles (the scores they administered on each role) have been identified by the multidimensional scaling (MDS) and Multidendogram methods. Based on this, the typical leadership behaviors and competences identified in the learning journals of leader students have been analyzed qualitatively and grouped according to their team role similarities.

Team Role Similarities

The output from the MDS is presented in Figure 3.29 in the form of a 2-dimensional map where the distances between the leader students correspond to the similarities between their role preferences. For example, L1 and L2 were very similar leaders because both had high preferences for the "monitor evaluator" role and low preferences for the "teamworker", "plant" and "coordinator" roles (see the direction of the arrows in Figure 3.29).

On the right hand side of the MDS, in general, located were the leaders with a primary team role preference for the "shaper" role and on the left side were the leaders who had no "leadership role" preferences. The exception to this generalization was the L10; despite of her primary "shaper" role she was positioned in the left side of the map (apart from the other shapers) due to her high preferences for the "teamworker" role.

The dendogram in Figure 3.30 presents the similarity of the leader students using Multidendogram method. It can be readily seen that there were two major groups of leaders: G1and G2. The distinction was the difference on the role a team role preference as shown below.

G1: High preference for the "monitor evaluator" role

G2: Low preference for the "monitor evaluator" role

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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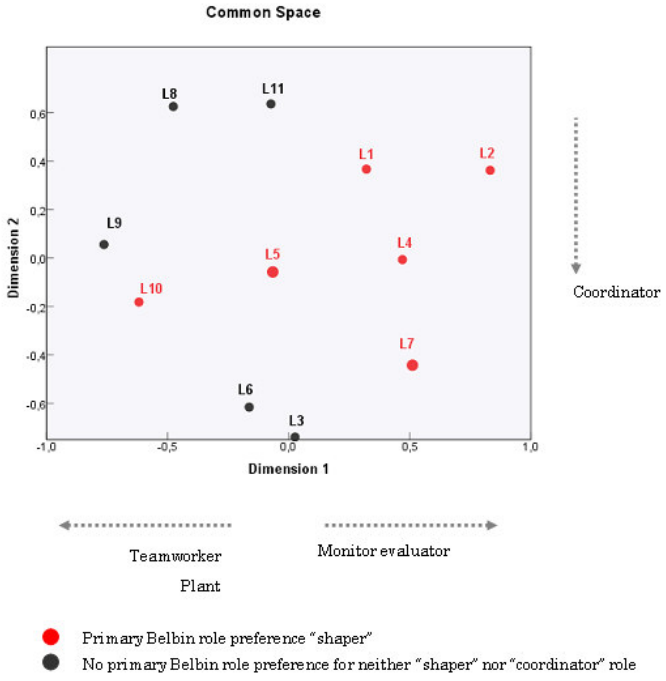

Figure 3.29: Two-dimensional MDS solution for the eleven leader students based on the Euclidean distances between their standardized preference scores on the eight team roles. Leaders are marked according to whether they have a "leadership role" preference or not. Stress value = 0.054. The arrows indicate the direction in which the preference for a team role was increasing.

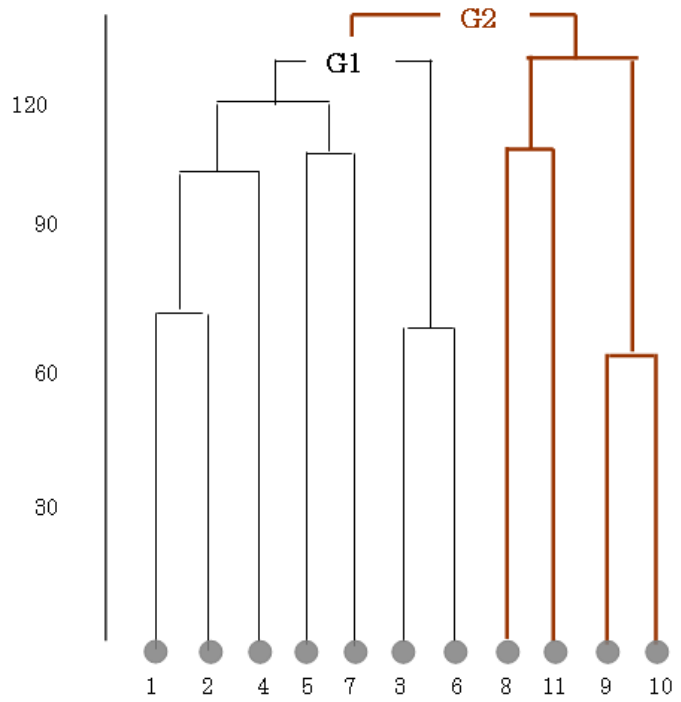

Figure 3.30: A dendogram of the cluster tree corresponding to the eleven leader students scores on the eight team roles

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The sub-groups of leader students are presented below together with their role preferences that distinguished them from the other sub-group of leaders.

(G1)	High monitor evaluator (L1-L2-L4-L5-L7-L3-L6)	High Shaper-Low Coordinator	L1-L2-L4
		High Shaper-High Coordinator	L5-L7
		Low Shaper – High Coordinator	L3-L6
(G2)	Low monitor evaluator (L8-L11-L9-L10)	Moderate Shaper-Low Coordinator	L8-L11
		Moderate Shaper-Low Coordinator	L9-L10

Qualitative Analysis of the Learning Journals to Group the Leadership Behaviors and Competences According to the Leaders' Team Role Similarity

The types of leadership behaviors and competences observed in the learning journals of eleven leader students have been grouped according to their team role similarity as identified in the MDS: (a) leaders on the **left-hand** side of the MDS, (2) leaders on the **right-hand** side of the MDS. The results are displayed in Table 3.21.

In terms of **self-confidence** in the leadership role, 2 leaders from the left hand side of the MDS (L6-L9) appeared not so comfortable in the leadership role:

L6 (implementer)	Felt himself **rare and insecure** in this role and had self-doubts about his effectiveness as a leader.
L9 (plant)	In spite of considering himself as a hardworking and responsible person, he believed that **leadership was not something made for him**. He felt himself **useless** in the very competent team he had for not being able to reach the expectations of his team members and he was aware that another member in the team was pulling the team.

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 3.21: The leader students' observed leadership behaviors and competences according to their team roles similarities in the MDS (qualitative data obtained from the learning journals)

Competence	Left-hand side of the MDS	Right-hand side of the MDS
Self-confidence (in the leadership role	Feels not comfortable in the leadership role (L6-L9)	Feels secure and self-confident. (L1-L2-L4-L5)
Commitment to learning	Tries to demonstrate some leadership behaviors. (L6-L7-L8-L9-L10-L11)	Strives to be an excellent leader. (L1-L2-L3-L4-L5)
Teamwork (concern for the members)	Demonstrates lack of concern or interest for the team members. Does not approach. (L6-L9-L10, L11)	Demonstrates concern for the members and approaches them. (L1-L2-L3-L4-L5-L7)
Teamwork (action towards conflict)	Avoids conflict without bringing it out to open. (L6-L8-L9-L11)	Confronts conflicts in the team immediately. (L1-L2-L3-L4-L5)
Results Orientation (action against underperformance)	Condones ineffective performance. (L6-L8-L9-L11)	Confronts ineffective performance. (L1-L2-L3-L4-L5)

Note: The leader students who have a primary preference for the "shaper" role are highlighted in red color

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Conversely, the four leaders from the right hand side of the MDS (L1-L2-L4-L5) seemed very confident and comfortable in the leadership role (their primary roles were shaper).

In regards to their **commitment to learning *leadership***, 6 leaders (L6-L7-L8-L9-L10-L11) tried to implement several leadership behaviors:

L6-L8-L9 (has no leadership role preference)	They tried to demonstrate behaviors out of their comfort zone. L8, most of the times, could achieve this but L6 and L9, after several intentions, **relapsed into to their old ways of behaving**.
L7 (shaper)	Applied only those behaviors he believed that were important; he **did not want to apply everything taught** in the PMP course basically because **he believed neither** in the IDP approach nor in the need of planning the project, establishing objectives, etc.
L10 (shaper)	Tried to demonstrate several leadership behaviors but later she **got disinterested**.
L11 (teamworker)	Recalled the behaviors of her team leader to lead the team and that was the **only effort** she made to exercise leadership behaviors.

On the other side of the MDS there were five leaders (L1-L2-L3-L4-L5) who **strove to be excellent leaders**. However, in the goal of becoming a better leader, L5 seemed to differ from the others. The efforts of this leader seemed to be directed towards himself, his personal development. On the other hand, the other four leaders (L1-L2-L3-L4) tried to become better leaders for their teams and their team members. They worked on their perceived difficulties and **acted in manners that were out of their comfort zone**. They reflected on their leadership behaviors and investigated the reasons of why they acted in certain ways and decided to choose most appropriate way of acting for the well-being of their team.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

With regards to **concern for the members**, the leaders positioned on the left side of the MDS (L6-L9-L10-L11), generally, demonstrated a lack of interest or concern for the members.

L6 (implementer)	He knew his members' had problems but he **did not act** to solve their problems or endure the challenges.
L9 (plant)	The leader **was reliant on other people** for the resolution of all his team members' problems; whatever incident took place he told them to see the professors, coordinators, etc.
L10 (shaper)	She was initially complaining about the members' lack of motivation because she was feeling like **losing her time**. However, when the members came to her with their questions and doubts regarding the project (which might be considered as a demonstration of motivation), she complained about it as well; she **felt overwhelmed**. For her, resolving members' doubts and following their progress meant **additional work** and she **wasn't motivated** at all to do so. When the thing got tough in the project, she **did not want to help** the members either.
L11 (teamworker)	The leader **showed no interest whatsoever** for her team members; she **knew nothing about the team members** who practically did not come to the majority of the team meetings.

It worths noting that those leaders mentioned above **did not approach** their team members or **did not initiate contact** with them out side the team meetings; the members approached them.

The leaders on the right hand side of the MDS (L1-L2-L3-L4-L5-L7) showed varying degrees of concern and interest for their team members.

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L1-L3-L4 (shaper-implementer-shaper)	Showed genuine interest and concern for their members' and problems. They personally investigated the members' problems and tried to solve them.
L2 (shaper)	She was concerned about her members and she did not want them to lose their motivation.
L5 (shaper)	He was interested with the members and was there to solve their problems.
L7 (shaper)	He showed he was approachable for resolving the doubts and he personally investigated members' problems.

The above mentioned leaders had no problem in approaching their team members.

With respect to **confrontation** (underperformance and conflicts in the team) the leaders on the left hand side of the MDS (L6-L8-L9-L11) generally failed to take action against persistent underperforming members, and avoided conflict without bringing it out into the open. Conversely, the leaders on the other side of the MDS did not wait to take action against similar incidents.

Summary

The leader students who had a primary "shaper" role preference, in general, they felt themselves comfortable in the leadership role and strove to be excellent leaders. However, two of the six shapers (L7 and L10) did not insist on excelling their leadership capacity. These two leaders had the high hedonism value in common and this might explain the reason of their unwillingness to increase their leadership potential.

The shapers in general seemed to show concern for their team members but with varying degrees. The differences among these leaders might be explained by their value hierarchies. For example, the shapers who showed genuine interest and concern for the members (L1-L4) gave high importance on the benevolence value which is the enhancement of the welfare of others (social focus).

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

On the other hand, L5 showed interest for the members but he was mainly concerned with the accomplishment of the objectives and his personal development which might be explained by the importance he gave on stimulation and achievement values which had a *personal focus*. The shaper who did not show concern for the members (L10) gave priority to hedonism and self-direction values which were personally focused values.

In general, the shapers seemed to be comfortable in confronting performance problems and conflicts in the team. L10 was an exception to this. This might be explained by her high preference for the teamworker role.

The leader students who did not have a leadership role preference seemed to experience difficulties in approaching their team members, solving their problems, and confronting their underperformance and the conflicts in the team.

However, the results also showed that there might be cases in which a student without a "leadership role" preference might also excel as a leader. For example, the case of L3 demonstrated that leaders with "no leadership role" preferences could demonstrate as much leadership potential and behavior as the shaper leaders. The case of L8 demonstrated that the leaders with "no leadership role" preferences might also demonstrate leadership behaviors without falling back to their old ineffective leadership behaviors too quickly or frequently.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

3.5. THE EFFECT OF TEAM BALANCE ON TEAM PERFORMANCE

This final section reports on the results of the effect of team balance on team performance (Figure 3.31). To investigate this effect, five different team balance measures have been used:

(1) Belbin's basic concept (1981)

(2) Senior's modified measure (1997)

(3) Won-Woo and Hojin's Measure (2002)

(4) Partington and Harris's Balance Indexes (1999)

(5) Fisher's Task-Relationship Construct (1998)

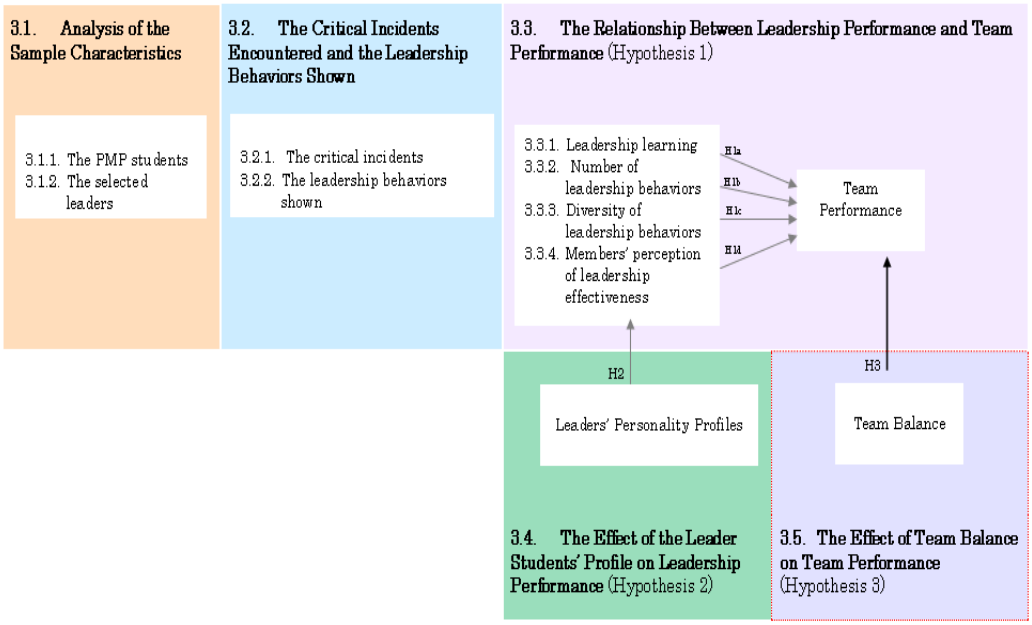

Figure 3.31: Schematic view of Section 3.5 in the results section

These measures have been developed to be able to define and measure team balance quantitatively based on Belbin's qualitative definitions. The first four measures have been taken from the available literature and they rely heavily on the assumption that the balance within a team is achieved when all team roles are represented in the profiles of members, at least, at a "certain

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level", e.g. highest scoring role level (Belbin, 1981), natural role level (Senior, 1997; Won-Woo, 2002), high or very high scoring role level (Partington and Harris, 1999).

However, these measures have been criticized for not taking into account the notion of suitability of role pair combinations and this study has introduced the Fisher's task relationship construct (1998) to investigate the effect of balance on team performance from the perspective of the members' role pair combinations.

Data have been collected from 24 IDP teams but due to missing data in some teams, only the data from 18 teams have been used for the first four balance measures stated above.

For the fifth measure (Fisher's task relationship construct), data from 10 team have been used as in the other eight teams, the members' equal preferences for team roles made it not possible to identify their interaction types (e.g. primary role: plant, secondary role : coordinator-shaper).

Belbin's Basic Concept (The balanced and unbalanced teams)

To determine whether balanced teams, as defined by the Belbin's basic concept, performed better than unbalanced teams, IDP teams have been categorized into two categories; balanced and unbalanced.

Of the 18 IDP teams investigated, 3 of them were balanced and 15 of them were unbalanced. This meant that in the majority of the IDP teams (83.33%) there were unrepresented team roles. Table 3.22 provides information on the frequency of unrepresented team roles in the IDP teams.

Table 3.22: Frequency of unrepresented team roles in project teams (unrepresented roles are defined according to Belbin's basic concept)

Team Role	Frequency
Resource Investigator	8
Co-ordinator	5
Monitor Evaluator	4
Plant	3
Total	20

Note: Total = (12 teams * 1 role unrepresented) + (1 team * 2 roles unrepresented) + (2 teams * 3 roles unrepresented) = 20.

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

"Resource investigator" was the team role that was unrepresented in project teams with the highest frequency (times unrepresented = 8), followed by the roles of "co-ordinator", "monitor evaluator" and "plant".

In essence, it could also be stated that "shaper", "completer finisher", "implementer", and "teamworker" were represented in all of the 18 project teams as the first or highest scoring team role in the profile of the members (See Appendix 4F-1) for the list of project teams with the numbers and the names of unrepresented team roles.

Independent t-test has been conducted to test the differences in mean team performance scores between balanced and unbalanced teams (normality of data is presented in Appendix 4F-2).

The results in Table 3.23 demonstrate that there were no significant differences between balanced and unbalanced teams in terms of team performance using Belbin's basic concept to identify the balance of the teams ($p > 0.05$), small effect size.

Table 23: Means, standard deviations, test of homogeneity of variances (Levene's Test), and the results of t-test for the equality of mean team performance scores using Belbin's basic concept

Variables	Groups	*M*	*SD*	Levene's Test for equality of variances		T-test for equality of means		
				F	*Sig.*	t	*df*	*Sig.*
Team Performance	Balanced	7.06	0.24	0.75	0.40	-0.88	16	0.20
	Unbalanced	7.32	0.49					

Note: $N_{\text{balanced teams}} = 3$; $N_{\text{unbalanced teams}} = 15$, one-tailed significance values are reported

Senior's Modified Measure (The balanced and unbalanced teams)

IDP teams have been categorized into two categories of balance (balanced and unbalanced) using Senior's both measures of balance.

Table 3.24 provides an overview about the extent to which Senior's two criteria of team balance have been met by the project teams in this study. It is apparent table that of the 18 project teams involved in this study only eight of

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them were balanced according to Senior's first measure. Two measures of balance considered together led to only two balanced teams (i.e. sixteen unbalanced teams).

Table 3.24: Project teams fulfilling Senior's first and second measure of team balance ($N_T = 18$)

Project Teams	First Measure	Second Measure
1	√	√
2		
3	√	
4		
5	√	
6	√	
7		
8		
9		
10		√
11		
12		√
13	√	√
14		√
15	√	
16	√	
17		
18	√	

In fact, relatively small number of balanced teams identified in this study, using Senior's measure, seems to be consistent with previous research in this field (Won-Woo and Hojin, 2002; Van de Water *et al.*, 2008). A recent study of Van de Water *et al.* (2008) reported that out of the 39 teams in their study, they detected 4 balanced teams using Senior's algorithm. This number was even smaller in the study of Won-Woo and Hojin (2002); where only 2 teams were identified as balanced teams out of the 52 teams in the study.

Considering the fact that Senior's two measures of balance resulted in a very small number of balanced teams (N=2) and that her second criteria (20 point variation) was rather arbitrary (Senior, 1997) and was not based on conceptual or theoretical background (Van de Water, 2007), Senior's first measure of balance has been used for the identification of team balance. Therefore, only those eight teams that fulfilled the requirements of Senior's first measure have been considered to be balanced.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Independent t-test has been conducted (normality of data is presented in Appendix 4F-3) to test the effect of team balance on team performance.

The results in Table 3.25 demonstrate that there were no significant differences between balanced and unbalanced teams in terms of team performance using Senior's first measure of balance (roles represented at the *natural level*) to identify the balance of the teams ($p > 0.05$).

Table 3.25: Means, standard deviations, test of homogeneity of variances (Levene's Test), and the results of t-test for the equality of mean team performance scores using Senior's first measure of balance

Variables	Groups	*M*	*SD*	Levene's Test for equality of variances		T-test for equality of means		
				F	*Sig.*	t	*df*	*Sig.*
Team Performance	Balanced	7.16	0.37	0.15	0.70	-1.02	16	0.16
	Unbalanced	7.38	0.52					

Note: $N_{\text{balanced teams}} = 8$; $N_{\text{unbalanced teams}} = 10$, one-tailed significance values are reported

The study of Higgs, Plewnia, and Ploch (2005) showed partial support for the hypothesis that balanced teams would perform unbalanced teams. The results from their study indicated that team performance was positively influenced by high diversity for teams with *high complexity tasks*. In addition, their results demonstrated that high team diversity was detrimental for team performance for the teams with less complex, more process driven tasks.

Won-Woo and Hojin's Measure (The number of team roles represented in a team at different score-criteria)

To investigate whether the number of team roles presented in a team at 70-score, 80-score, and 90-score criteria was associated with team performance, correlation coefficients have been calculated (See Appendix 4F-4 for the normality of data).

The results are presented in Table 3.26. No significant correlations were detected between the number of roles represented at different score-criteria (i.e.

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70, 80, and 90) and team performance. Thus, our findings here, do not replicate those of Won-Woo and Hojin (2002) that indicate an increase in team performance with an increase in the number of team roles represented at 90-score-criterion.

Table 3.26: Pearson correlation coefficients for the relation between the number of team roles presented in a team at different score criteria and team performance (associated significance values are presented in parentheses)

Number of team roles presented at	Team Performance
70-score criterion	-0.22 (0.39)
80-score criterion	-0.42 (0.08)
90-score criterion [a]	-0.17 (0.50)

"a" = Spearman rank correlation coefficient is reported due to the non-normal distribution of the data

Partington and Harris's Balance Indexes

Correlation correlations have been computed to determine whether team performance was associated with the 3 team balance indexes of Partington and Harris (1999). Descriptive data about the indexes are presented in Appendix 4F-5.

The results are displayed in Table 3.27 together with the findings from previous literature. It is apparent from this table that there was no significant relationship between team balance (as measured by the balance indexed developed by Partington and Harris, 1999) and team performance, $p > 0.05$. Our findings are in agreement with those from the other studies (Table 3.27) which did not detect any significant relationships between balance indexes and team performance either.

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Table 3.27: Correlation coefficients for the relation between team balance indexes and team performance

	Team Performance			
	Present Study [a]	Partington & Harris (1999) [b]	Van de Water *et al.* (2007) [a]	Blenkinsop & Maddison (2007) [b]
TB1	-0.04	-0.05	-0.01	-0.37
TBI2	-0.26	0.01	0.23	0.08
TBI3	0.46	-0.19	0.07	na

"a" Spearman rank correlation coefficient; "b" = Pearson correlation coefficient, for all the correlations presented $p > 0.05$.

Fisher's Task-Relationship Construct

Correlation coefficients have been calculated to investigate the relationships between the number of members in the three interaction types in a team and team performance (See Appendix 4F-6 for the descriptive statistics). The results, as shown in Table 3.28, indicate no significant relationships between the number of team members in different interaction types and team performance.

Table 3.28: Correlation coefficients for the relation between the number of team members in three interaction types and team performance

		Team Performance
T1	Interacts neither harmoniously nor productively	-0.06 (0.88) [a]
T2	Interacts harmoniously but not productively	0.42 (0.23)
T3	Interacts both harmoniously and productively	-0.43 (0.45)

Note: "a" = Spearman's rank correlation coefficient is reported due to non-normal distribution of the data

UNIVERSITAT ROVIRA I VIRGILI
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CHAPTER 4

CASE STUDIES

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4.1 CASE STUDY 1

L1's leadership picture

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4.1.1. INTRODUCTION

The aim of this case study is to provide a detailed analysis of leader 1 (L1)'s leadership; that is the leadership behaviors exercised by this leader throughout the whole academic year.

L1's leadership behaviors have been using five different research tools: (1) the learning journal, (2) the behavioral event interview, (3) 360-degree feedback, (4) a focus group, and (5) the team climate survey.

Before presenting the results, the personality profile of L1 and the characteristics of her team is presented in the following two subsections respectively.

L1's Personality Profile

L1's personality profile has been identified using instruments: (1) Belbin's Self Perception Inventory (BSPI), (2) Managerial Style Questionnaire (MSQ), (3), Myers-Briggs Type Indicator (MBTI), and (4) Schwartz Value Survey (SVS). Table 4.1 shows each instrument's findings.

Table 4.1: L1's personality profile

Team Role (Belbin)		**Managerial Style**		**MBTI**	**Values (Schwartz)**	
Primary	Secondary	Primary	Secondary		Primary	Secondary
SH	CF	AUT	COE	ISTJ	BE	CO

Note: "SH" = Shaper, "CF" = Completer finisher, "AUT" = Authoritative, "COE" = Coercive, "BE" = Benevolence, "CO" = Conformity

The primary and secondary **team role preferences** of L1 were "shaper" and "completer-finisher" respectively. These two team roles of L1 are concerned with obtaining results for the team: the "shaper" is a demanding leader who galvanizes the team into goal-directed activity, and the "completer-finisher" attends to the details of the team's product, relentlessly following-through and ensuring that everything is finished on time (Belbin, 1981-1993, Fisher et al., 1998).

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

The primary and secondary **managerial styles** of L1 were "authoritative" and "coercive" respectively. "Authoritative" leaders clearly articulate a vision and mobilize people towards it. Under this management style, people clearly understand what they have to do and why it matters. They are clear about the standards for success and the reward. They have great freedom to innovate and flexibility in accomplishing goals. Under the "coercive" style, the leader tells people what to do; this style does not allow people to think for themselves or to be creative although it is useful in emergency situations.

The **MBTI type** of L1 was "ISTJ". ISTJs are typically seen as calm and reserved and are likely to be uncomfortable expressing affection and emotion towards others. However, their strong sense of duty usually allows them to overcome their natural reservations. They are very loyal and faithful; they place great importance on honesty and integrity. The ISTJ is usually a hard worker and has the ability to define, organize, plan, and implement tasks and complete them on or before the deadline.

The **high-priority values** of L1 were "benevolence" and "conformity". People who value "benevolence" try to enhance the well-fare of people with whom they are in frequent personal contact. People who value "conformity" restrain themselves to prevent any possibility of their actions and inclinations from upsetting or harming others..

The Team of L1

L1's team was composed of 6 first-year Ch.E. students (Table 4.2). All the team members were full time students and one member was repeating the first-year.

It can be observed that L1's team was not balanced. The "plant" (PL) and "resource investigator" (RI) team roles were not represented as primary or secondary team roles in the profiles of the team members.

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.2: The characteristics of the team members led by Leader 1

Team Members		Situation	Belbin Roles		Team Balance	Missing Team Role
			Primary Role	Secondary Role		
M1	Noe	F.S.	IMP	CF	Unbalanced	PL & RI
M2	Charlotte	F.S.	CF	ME		
M3	Drake	F.S.	IMP	TW		
M4	Jack	F.S.	ME	IMP		
M5	Jonathan	F.S.	CO	SH		
M6	Steve	F.S.-Repeating	IMP-SH-RI	IMP-TW		

Note: "F.S." = Full time student, "IMP" = Implementer, "CF" = Completer finisher, "ME" = Monitor Evaluator, "TW= Teamworker, CO = Coordinator, "SH" = Shaper, "RI" = Resource investigator, "PL" = Plant, "Repeating" = the member was repeating the 1st year.

4.1.2. DATA ANALYSIS & RESULTS

This section presents the analysis of data gathered from L1's: learning journal, behavioral event interview, 360 degree feedback, focus group, and team climate.

4.1.2.1. LEARNING JOURNAL

The analysis of the learning journal seeks to identify:

(1) L1's journal entries,

(2) The leadership behaviors coded in her journal, and

(3) The characteristics of the team and the leader as identified by the leader's narrative explanations in the journal.

(1) L1's Entries to the Journal

This section examines in brief L1's journal entries throughout the academic year. Her journal was 22 pages in length and she made a total of 30 entries in the journal. The first entry was made on October 23rd, 2007 and the last entry on April 30th, 2008.

The regularity and the frequency of L1's entries in the learning journal are illustrated in Figure 4.1, which plots the number of entries made by L1 versus the weeks of journal writing activity.

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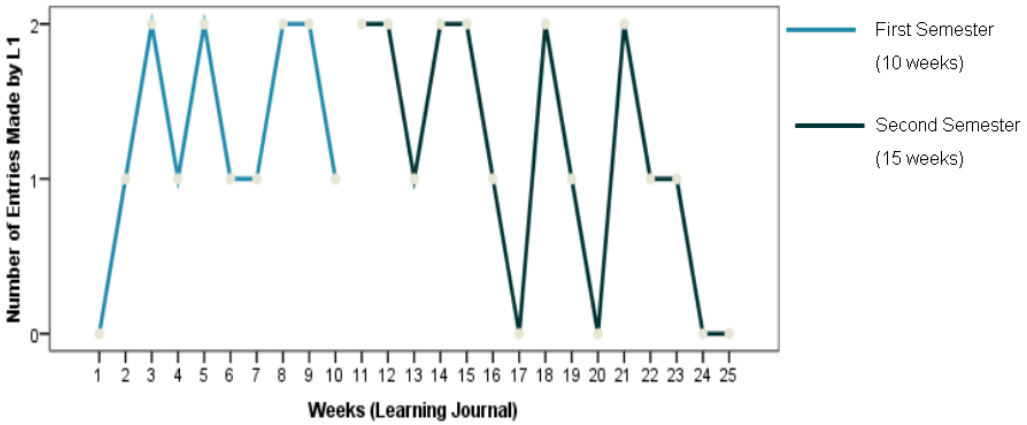

Figure 4.1: Number of journal entries made by L1 during the course of journal writing activity

It can be seen that L1 made journal entries for 20 of the 25 weeks of the journal writing activity.

L1's journal entries were regular in the 1st academic semester. In the 2nd semester, she missed four entries (at weeks 17, 20, 24, and 25). She made two entries in the week 18 and week 21; her first entry described the previous week's events that she had not yet recorded (in this case week 17 and week 20) and her second entry explained the events of the week in which she made the entry (in this case week 18 and 21).

Half of the time she wrote in the journal, she made two entries per week (i.e. she made 2 entries in 10 of the 20 weeks).

(2) Leadership Behaviors in L1's Learning Journal

This section has two main objectives. From the leadership behaviors coded in her journal, the section aims:

(a) To identify the proficiency levels of these behaviors and to compare them with the group of eleven leaders (Figure 4.2).

(b) To show the corresponding competences for these coded behaviors at each proficiency level (Table 4.3).

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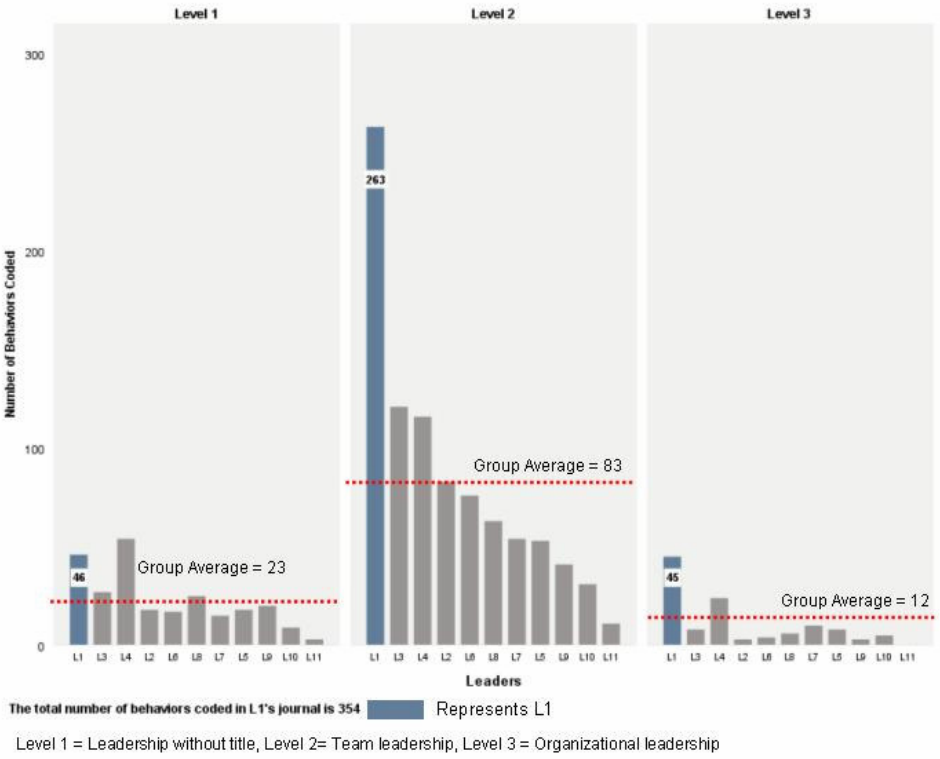

Figure 4.2: Frequency distribution of the 354 leadership behaviors coded in L1's journal across three proficiency levels and how this compares with the group of eleven leaders

A total of 354 leadership behaviors were coded in the learning journal of L1 (Figure 4.2). Of these behaviors;

46 were at level 1 (leadership without title),
263 were at level 2 (team leadership), and
45 were at level 3 (organizational leadership).

It is clear that the majority of the behaviors coded L1's journal were at **level 2** (team leadership) although were also behaviors coded at **level 3** (organizational leadership).

Compared to the group of leaders, L1's journal had the **highest number of leadership behaviors** coded at level 2 and level 3 (Figure 4.2).

It is worth noting that L1's journal had **as twice as many** level 2 leadership behaviors as the journal of her closest peer. The closest leader at level two was L3 with 121 coded behaviors ($121 * 2 = 242 < 263$ behaviors in L1's journal at this level).

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The corresponding competences for those leadership behaviors coded in L1's journal are presented in Table 4.3. The first thing to note is that L1 demonstrated **a very broad range of** leadership competences and behaviors at each of the three proficiency levels.

Six competences were identified at level 1 and level 2 and five competences were identified at level 3. The occurrences of these competences across three proficiency levels are summarized below. The three competences identified in L1's learning at all three proficiency levels were: "commitment to learning", "results orientation", and "interpersonal communication".

Competence	**The Levels Coded at**
Results Orientation	Level 1 - Level 2 - Level 3
Commitment to Learning	Level 1 - Level 2 - Level 3
Interpersonal Communication	Level 1 - Level 2 - Level 3
Integrity	Level 2 - Level 3
Drive for Excellence	Level 2 - Level 3
Teamwork	Level 1 - Level 2
Responsiveness to Change	Level 1
Client Orientation	Level 1

The competences of "integrity" and "drive for excellence" competences were identified at both level 2 and 3. "Teamwork" was identified at both level 1 and 2. The competences of "responsiveness to change" and "client orientation" were only identified at level 1.

The number of behavioral descriptors coded in L1's journal for each proficiency level is summarized below. A total of 59 different behavioral descriptors were coded in L1's journal.

Levels	**Number of Behavioral Descriptors**
Level 1	14 descriptors
Level 2	30 descriptors
Level 3	15 descriptors
In Total	59 behavioral descriptors

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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Table 4.3: The frequency distribution and descriptors of the 354 behaviors coded in L1's learning journal across proficiency levels and competences

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Strives to be competent.	9
			2	Learns from own and others' mistakes and experiences.	3
			3	Puts into practice everything learns.	3
			4	Seeks feedback to improve performance.	2
			5	Sees setbacks and errors as a chance to improve.	2
			6	Shares knowledge and experience with others.	1
		Total			**20**
	Teamwork		7	Demonstrates confidence and respect for others.	10
			8	Is ready to make personal sacrifices.	3
		Total			**13**
	Results Orientation		9	Knows when she has a problem and acts immediately.	3
			10	Identifies what needs to be done and acts without waiting.	2
		Total			**5**
	Interpersonal Communication		11	Knows how to listen actively being primarily concerned with understanding.	2
			12	Ensures that the others understand the importance of what she is conveying.	2
		Total			**4**
	Responsiveness to Change		13	Adapts self rapidly to new situations.	3
		Total			**3**
	Client Orientation		14	Follows up the clients' degree of satisfaction.	1
		Total			**1**
	Total in Level 1				**46**
Level 2	Teamwork		1	Demonstrates caring leadership.	39
			2	Assesses and selects appropriate approach to lead.	14
			3	Creates an atmosphere of mutual trust, confidence, and respect.	12
			4	Positions self as the leader.	9
			5	Confronts conflicts in the team in a timely and constructive manner.	8
			6	Gives recognition to the contribution of others.	7
			7	Facilitates meetings.	7
			8	Promotes communication in the team.	5
			9	Ensures that the others have clear objectives.	1
		Total			**102**
	Commitment to Learning		10	Provides a balanced view of the strengths and weaknesses of others.	27
			11	Is committed to enlisting support for members.	16
			12	Asks insightful questions that facilitate learning and understanding.	8
			13	Calms others in new learning situations.	7
			14	Provides timely and constructive feedback for development.	3
			15	Helps the others to learn to solve the problems on their own.	1
		Total			**62**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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Table 4.3 - continued

Level	Competency			Behavior	Frequency
Level 2	Interpersonal Communication		16	Understands others' underlying needs, interests, problems and motivations.	32
			17	Convince others appealing to their interests.	5
			18	Presents logical and convincing arguments.	4
			19	Demonstrates tact and diplomacy.	1
		Total			**42**
	Results Orientation		20	Confronts people with performance problems.	15
			21	Manages performance.	11
			22	Provides timely constructive feedback.	5
			23	Conveys a sense of urge to finish the work or solve the problem.	4
			24	Holds people accountable for their performance.	3
			25	Readily adjusts plans to achieve objectives.	2
			26	Does not shy away from evaluating the work of others.	1
		Total			**41**
	Integrity		27	Immediately confronts inappropriate behavior.	5
			28	Treats others justly.	4
		Total			**9**
	Drive for Excellence		29	Helps others to generate ideas to make things better.	4
			30	Demonstrates a positive attitude to doing things.	3
		Total			**7**
	Total in Level 2				**263**
Level 3	Results Orientation		1	Gives others liberty to decide how to work.	6
			2	Demands high performance (using herself as an example).	5
		Total			**11**
	Commitment to Learning		3	Encourages others to learn continuously from their activities as well as from others.	6
			4	Helps others to discover their capacities and potential.	3
			5	Looks for and proposes adequate challenges for personal development.	1
		Total			**10**
	Drive for Excellence		6	Instills in others a desire to continuously improve the way the things are done.	7
			7	Recognizes others' creativity and innovation.	2
		Total			**9**
	Integrity		8	Acts as a role model to demonstrate organizational values.	4
			9	Defends what she believes to be true and necessary even if it is not popular.	2
			10	Can be trusted with confidential information.	1
		Total			**7**

UNIVERSITAT ROVIRA I VIRGILI
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Table 4.3 - continued

Level	Competency		Behavior	Frequency
Level 3	Interpersonal Communication		11 Is easily approachable.	3
			12 Describes a vision for the future that inspires others to work to achieve it.	2
			13 Acts as a role model.	1
			14 Speaks with conviction and in an inspirational manner about the objective and importance of daily work.	1
			15 Interacts with others in a manner that increases their motivation.	**1**
		Total		**8**
	Total in Level 3			**45**

It can thus be said that L1 exhibited a wide range of leadership behaviors at all proficiency levels. On the basis of the behaviors exhibited *at level 1*, it can be said that L1 was a leader who was: striving to be competent, learning from hers and others' mistakes and experiences, taking action without waiting, and demonstrating confidence in her team members.

Looking at the behaviors demonstrated *at level 2*, it can be seen that L1 positioned herself as the leader and assessed the appropriate leadership approach. She was knowledgeable about the members' strengths and weaknesses and was therefore able to enlist her support when the members' needed it. She asked insightful questions to facilitate the members' learning. She was skilled at understanding the unspoken (e.g. feelings, worries, problems). This understanding enabled her to demonstrate caring leadership and to act to solve members' problems. She managed performance, provided timely constructive feedback and did not shy away from evaluating the work of members. She immediately confronted underperformance, inappropriate behavior and conflicts in the team. She treated members justly.

The behaviors coded *at level 3* demonstrated that L1 was an inspirational and motivational leader with integrity who instilled in others the desire to continually improve. She demanded high performance and gave the members freedom to decide how to do their work.

UNIVERSITAT ROVIRA I VIRGILI
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(3) The qualitative data about the team and the leader

This section uses qualitative data in the form of written narratives to provide L1's perceptions about her team and to elaborate on her characteristic leadership behaviors. Relevant journal excerpts are presented where appropriate.

L1's Perceptions about Her Team Members

L1's perceptions regarding her team and its members functioning are shown in Table 4.4 and Table 4.5 respectively. According to L1, there were three members of the team (Noe, Charlotte, and Drake) who were not participative during the team meetings in the first academic semester.

Noe was a quiet team member who did not participate in the meetings and who was nervous when asked a question by the leader. L1 was of the opinion that, in the first semester, Noe did not defend her ideas and she did not tell her peers when she detected any mistakes they had made so as to avoid any friction in the team. Additionally, Noe believed that the other team members did not want to meet up with her in the library to work on the project because she had a different cultural background.

Charlotte was another quiet team member. In the first semester, she was not participative in the team meetings and barely responded to the leader's questions. Conversely, outside the team meetings Charlotte had no apparent difficulty in interacting with the leader.

Drake was another silent member who appeared to be switched off during the team meetings. The leader thought that Drake had little interest in learning and finding out how everything was going.

The fourth member, **Jack**, seemed to be the only motivated member in the team. According to the leader's explanations, he appeared to be an enthusiastic team member who was eager to learn and apply new things in the project.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.4: L1's perceptions about her team members

Person	Qualitative Data	Week
Noe	Noe participated a lot; however, until now she has been very quiet and became nervous when I asked her something to make her participate.	2
	When I asked her what she thought about the project she responded "the same as the others".	5
	Noe explained to me that nobody with whom she had to do an activity wanted to stay with her in the library.	5
	I feel a certain frustration in Noe. She does not feel identified with any activity. She does what she has to do but she does not defend her ideas.	8
	During the coaching session, I spoke to Noe quite a bit. When she sees errors she does not say so because she wants to get along with the other members and she doesn't want to upset the person who did the activity. She does not want to appear like a person who always brings bad news. I don't know if my arguments convinced her to act differently. She said yes, that she understood me but I think sooner or later she will go back to acting as she was. I will try to be there to make sure she doesn't.	12
	Today Noe brought a notebook with notes taken about the project. I liked it because it is a good habit and demonstrates her intention to improve.	14
	I could see that Noe wanted to meet with other members on Fridays to speak about the activities, the team functioning etc. I have tried to tell Noe that she has to say what she thinks without fear. Finally, she managed to get them to meet and give feedback on Friday.	18
Charlotte	Charlotte has not opened her mouth, even when I have been insisting on questions like: "have you read this?" "What do you think about that?" She is attentive, she takes notes of the parts that affect her but she does not participate actively in the meetings. Outside the meetings, she talks with me in an open manner. I don't know she is silent because she is not interested (I don't think so) or because she feels shy.	3
	I was shocked by the comments about Charlotte. They (the members) said that she was acting like a leader and if they did not finish the work she said she would cut their arms and legs off. I have never thought of Charlotte in this way. I was a little scared because I realized that I might not know her well enough. Charlotte is always quiet in the meetings, rather shy when speaking. I did not think that the other members would fear her.	5
	Charlotte has participated in the meeting not much but quite a lot compared to the other times.	8
	If I see her in the library, she tells me what she is doing but during the meetings she almost never opens her mouth.	8
	I also think that she is slow, sure but slow. I asked her if she could finish attaching the documents. She assured me that during the night she would finish it and if not she would not go to the class tomorrow to do it. This is the first day that I have seen her making a personal sacrifice. I see her very motivated.	9
Drake	Drake continued without saying anything. I feel he switches off and doesn't listen. I regret not being able to make him participate more. I think about it a lot but I cannot think of anything else I can do other than asking questions to make him talk.	2
	What I did not like to see was how Jack and Jonathan headed to the teachers' offices (surely to discuss PFD with F. Giralt) whereas Drake, who was with them both, turned back home. It is true that he is not responsible for the activity but he demonstrates very little interest in learning and finding out how everything goes. I have to motivate and involve this member more. I have seen this from the first day.	3
	On Wednesday, I had a coaching session with Drake. Drake once again surprised me with his attitude. He seemed very happy with my proposal and seemed quite willing to work together and to improve. He seemed convinced that the project would help him to improve his organization and initiative. He proposed the areas where he could improve.	12
Jack	Today, I noticed again that he is motivated….. When I told them the BM can be solved by Excel or by EES, Joan said EES while the others looked like that they did not want more work.	2
	Jack was one of the most convinced of all the members that the project would be useful for his future development.	5
	Jack said in the meeting today that he met a girl who had told him that N_2 could be separated by a compressor and he suggested putting this in the project. I was really pleased that he had looked for information and thought about how to improve the process. This is the attitude I want to foster in all of them.	5

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.4 - continued

Person	Qualitative Data	Week
Jonathan	We have decided to meet on Friday to hold the seminar about the Word and EES. Jonathan said that he would have to leave if the seminar took long time. …I regret that he would not stay instead of going back to his village.	3
	Jonathan, Noe and Charlotte met this Friday to study the structure. However, Jonathan left after one hour because he wanted to go to this village. I find this an infantile attitude; they can't make personal sacrifices as having lunch one hour later or taking a train that departs later. …I don't understand how people can be unable to adapt themselves to the rhythm of the work or to a different life.	4
	Today, Jonathan said: "Henry adapts to the team but the team does not adapt to Henry." It is positive that he feels to be part of the team by comparing the situation with an anecdote about Barcelona football club.	4
	Jonathan is very individualistic.	6
	Jonathan was distracted occasionally in the meeting.	8
	Jonathan came to the meeting 15 minutes late.	8
	When I had the coaching session with Jonathan, I was disappointed. He is very skeptical about all this. He wants to do the project to pass the courses and that's it. He does not believe in teamwork, social competences or anything. He did not look at my eyes when talking to me, he yawned and was in a hurry to go to have lunch.	12
	Jonathan is concerned about his grade but makes little effort.	14
	Jonathan is always concerned about the grade.	15
	….He is much more involved in the project, works better in the team and does quality work.	18
Steve	Steve is still worrying me. He does good work and he writes well but I am afraid that he might be a bad influence for the other members. He is repeating the first-year and he compares this project with the one from the last year. In part, that is good because he has experience, but I don't like it when he explains how they cheated in the previous project or when he says a course or a professor is *bullshit*.	2
	Steve makes a lot of jokes; he compares me with his leader from the previous year and tells me that he will criticize me whenever he can. He is happy to make jokes to receive attention. I try to prevent him from being disrespectful to his peers.	5
	Steve went out the previous night. He did not go to the class and it was lucky that he came to the meeting 15 minutes late. It bothers me him coming to the meetings with red eyes and his breadth smelling of alcohol. I find it a huge lack of respect for all his peers. I don't think it will be me who tells him this. I can not try to judge what he does with his life outside the project.	5
	Steve told me that he found the project work too much.	7
	Steve worries me. All along the meeting, he laughed. This normally happens. However, today he laughed at everything that was being said.	8
	I would like highlight a positive thing about Steve. In this meeting and in all the other, he writes down the things that have been agreed upon, even when he is not the meeting secretary. The truth is he participates a lot.	8
	Steve did not come to the meeting and he did not contact us to let us know. He did not say anything until 16.00 o'clock. He sent them an SMS saying that he had fallen asleep.	8
	Regarding the personal coaching, Steve appeared to be more open than I have expected. However, I don't believe this 100 % because I know him.	12
	My interpretation is that he is not working at the same rate as the other members. Another team member told me they could not complain about Steve not going to the classes or failing the exams because he was dedicated to his part in the project. I think it has been a great "achievement" to make him participate in the project.	18
	Yesterday we all went to have breakfast together. I did not think that Steve would come because he goes out on Thursday nights. However, he came and on time. Even if he did not sleep during the night, he came to the meeting at 8.00 o'clock.	19

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The leader described the fifth member, **Jonathan**, as an individualistic member who could not make personal sacrifices to work on the project. Jonathan seemed to be concerned only about the grade and so he was doing the project solely to pass the courses. He was skeptical about the project for he did not believe in teamwork or social competences.

The sixth member, **Steve**, was probably the most worrying member for the leader. He was repeating the project and he had definitely not liked his pervious project experience. L1 was concerned that Steve's behaviors might have a negative impact on the other members, for example, when he explained to them how his team had cheated in the previous project. Apart from that, Steve was laughing and making jokes during the team meetings, he was not going to the classes and he was arriving late at the meetings on Fridays. Steve had the habit of going out at Thursday nights and on one occasion he came to the meeting with red eyes and breadth smelling of alcohol. Apart from Steve's undesired behaviors, the leader also mentioned his good qualities: he was doing quality work, was writing well, and was taking notes during the meeting even when he was not the meeting secretary.

The leader's perceptions regarding the team in general are presented in Table 4.5. According to L1, her members lacked: participation, organization, interest, initiative, responsibility and manners in the first semester. However, in the second semester, L1 observed changes in the team's functioning (last row of Table 4.5).

In the **1st row** of Table 4.5, we see that L1 was concerned about the *members' lack of participation* during the team meetings. The members only participated when speaking about their respective activities and did not give their opinion when the other members spoke about their activities.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.5: L1's perceptions about her team members' functioning

Dimension	Qualitative Data	Week
Participation and interaction	I was happy because it is difficult to make Charlotte and Noe participate but today they did.	3
	Today, we visited the laboratories. It helped me to confirm that Charlotte, Noe, and Steve find it difficult to interact with professors.	4
	I think it was the best meeting to date. I say this because they have been all participative. For Noe and Drake it is difficult but when I ask them questions they speak and explain.	5
	They participate when speaking about their activities but they don't express any opinions about the others' activities.	8
Lack of organization, interest, initiative, responsibility	I felt somewhat nervous yesterday and felt I had to correct things that I had already corrected last week. I don't know if I don't explain myself well, if they don't have time, or if they don't correct things because they don't take them seriously…..	3
	The planned activities were not completed (neither the structure nor BM). I told them that they had one week and they should take advantage of the 4 days of holidays. I could not convince them so they split the task among them. It makes me angry that they are wasting time.	4
	I was very surprised to see them leaving without finishing the work. For me it is unthinkable to lose an afternoon when there are balance calculations to do. I get agitated because I can see that they don't' get involved enough. **I want them to get more involved**.	4
	In general, they are studious and hardworking. If they organize themselves better, they can achieve good results.	5
	This week I sent part of my feedback via email. This seemed fine to some members. But the majority did not look at the feedback (how can they have so little interest?)	8
	I am surprised and angry at their small sense of responsibility. They were supposed to start the activity by the 4th day of last month. Instead, they started on 4th of this month. Moreover, they have taken 2 days holiday when they have got a lot to do. I establish deadlines, I advise them to meet and work, I organize their week more or less but they are so relaxed. They think that they can do it all in one afternoon; I don't know when they are going to learn that they can't. **I have to say that they have improved a lot during these 3 months. But there is something missing**. The team is missing someone who will organize and put pressure on them to keep it moving forward. I have very hardworking people but it is very difficult for me to get them do more than what is assigned to them.	8
	On the other hand, I feel frustrated because the team is not how I visualized it. In some aspects yes, but not in all aspects. I think I can't complain because we have not had big problems, **but I was expecting more**.	9
	On the day of the poster presentation I arrived at 09.45 am and they were the only ones who did not have a poster!!! Steve had taken charge of it but he did not show up. The saddest part of it was Jonathan telling me "he told us that he would come later." Incredible! They were not bothered because he had told them that he would arrive late. How can they be so nonchalant?!!!! They have very little initiative. **This attitude is what I have set out to change but the truth is I don't know how I am going to do it. I can't identify any specific course of action**…. Regarding the poster, I did not like it but at least it has some order and clarity…I have given them the freedom to prepare it according to their taste. I gave some advice on how to improve it because they had a week to edit and format things. They did not touch anything, simply because it is more convenient for them to leave it as it is and wait for somebody else does it.	10

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.5 - continued

Dimension	Qualitative Data	Week
Lack of organization, interest, initiative, responsibility	Another issue I personally find very disturbing is the following story: Noe detected an error in the IQ before the delivery. All she did was to send an SMS to Charlotte. Next day they handed the IQ in, Noe and the others knowing that there was an error. They had had all the morning to change it but they did not do anything. I told Charlotte that they could correct it. I intervened because I think that it was a good opportunity to develop their initiative (I assumed that faced with a critical situation surely they would react). One week after at the meeting, I asked them about it. They had not done anything and there were members in the team who only discovered at that moment, that there was an error. The most incredible and frustrating thing is THEY DID NOT CORRECT IT. It is always like this; if I don't tell them to do this and that by such and such a date nobody does anything. **I find it difficult to comprehend that they can act like this. I feel impotent; I don't know what to do to change the team and improve its initiative**.	10
	I got agitated again and they even made me angry. Friday, they were supposed to send me the planning so that I could review it and give them feedback. Yesterday, Jack called to tell me that he had forgotten to send me the document. They are so absent minded! Today, I received it the first thing. I was expecting something decent, but no. They simply copied the memorandum (after having summarized the sentences).	11
Members' bad manners	Something they have done has upset me. On Friday, after the meeting, we were all working in the library. They left before me and did not come to say me goodbye. I don't think it would have been difficult to come to say goodbye, especially because they had come two or three times to ask me questions. I was upset but I can not say anything. It is a question of manners and they are not my children.	8
	As the meeting was at 10 o'clock today, I brought cakes. Only Jack said me thanks to me. Their manners are none of my business, the only thing I do is to tell them that it is advisable to write an email beforehand if they want to see a professor.	8
Changes in members	I have seen them very motivated and proud of their project. I am glad that they see it like this because it will motivate them to continue.	9
	Today they have handed in their report which they were very satisfied with. In general, they were happy. All of them were rather nervous when they were going to hand in the document. This is good, it demonstrates interest. I was happy that they delivered it on time without rushing at the last moment. This meant that they could sleep the night before.	9
	We had the first meeting of the second semester. It went well. I am happy. I noticed that in general they had read the meeting's agenda and come to the meeting prepared.	11
	One thing that surprised me positively and made me happy was to see them in the library redoing the balance that they did badly the first time round. I could not believe that they were working together on their own initiative!!!	11
	I managed to get the members come to the meeting prepared and take it seriously.	11
	I went to the library to study. At 12 o'clock all the members arrived to work on the project. I was satisfied and proud to see them working as a team whilst being motivated and concerned about the quality of their work.	15
	The truth is that they have gotten more involved in the project during this second semester. I am happy with them.	16
	The thing that made me feel proud was to see them maturate as a team. Initially, they were 6 people who refused to work as a team, now they meet up to give feedback to each other.	18
	Ah! Today I also saw that Noe and Charlotte had brought a notebook in which they noted down the things regarding the project: such as dates, things to do, the hours spent working, etc.	18
	Today I was in the library at 12 o'clock and was surprised to see that they were all there (they have learnt to meet by themselves at that time). Steve also came! It is a big improvement for Steve to come to the meeting at 12 o'clock having only slept 2 hours. I am very happy that he did it.	19

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The **2nd row** of Table 4.5 presents the leader's frustration regarding the *members' lack of organization, initiative, and sense of responsibility*. The leader explained that in the first semester, the members did not complete tasks on time, they left the tasks unfinished, they went on holidays even when they had a lot of things to do and they did not take the initiative to correct the errors in the project. L1 could not believe that her members could show so little initiative, organization and sense of responsibility.

The **3rd row** of Table 4.5 shows L1's opinion regarding *the bad manners of the members*. She said that the members did not come to say goodbye to her when they left the library or thank her (except for Jack) the day when she brought cookies in for an early morning meeting.

The **last row** of Table 4.5 presents the *changes observed in the team members' behaviors*. Even though the leader accepted that the members had improved in the first three months of the academic year she wanted more; she wanted them to be more involved in the project, to have more initiative, and to be more responsible.

However, in the second semester, the members' behavior began to change. The leader said that the members matured as a team. They started to meet up on their own initiative to work on the project and to give each other feedback about their activities. They started to read the meeting agenda and to come to the meetings prepared. They began to meet in the library in their spare time to work together on project activities. Speaking in terms of the changes in individual member's behaviors, Noe started to defend her ideas and convinced the others to meet up to share feedback on their activities. Steve started to arrive punctually to informal Friday meetings even if he had been out the night before. The leader was very happy and proud to see these changes in team members and the team's functioning.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Characteristic Leadership Behaviors of L1

This section provides the characteristic leadership behaviors of L1 as determined by the qualitative data (journal excerpts) from her learning journal. Table 4.6 groups L1's characteristic behaviors under 4 main categories. The 1st group presents several of L1's behaviors as a leader[1]. The 2nd group gathers together L1's characteristic behaviors in relation to "teamwork" competence. The 3rd group collects L1's behaviors associated with "commitment to learning" competence. Lastly, the 4th group summarizes L1's behaviors in relation to "results orientation" competence. The possible links between these characteristic behaviors and the leader's personality preferences are presented wherever possible. Each group of behaviors is presented in the following pages together with the relevant journal excerpts.

Table 4.6: Characteristics of L1 as determined by the excerpts from her learning journal

1-AS A LEADER	2-TEAMWORK
• Is an inspirational, motivational, and encouraging leader • Is a self-aware leader • Is aware how her actions as a leader will impact others • Practices emotional self control • Is a leader of integrity	• Takes responsibility as a leader and positions self as one • Assesses appropriate approach for leading • Does the right thing for the team even it is difficult for her • Trusts her team members and demonstrates it • Promotes communication in the team • Unites members as a team • Is sensitive to members' problems and acts immediately to solve their problems and conflict in the team • Gives recognition and positive feedback
3-COMMITMENT TO LEARNING	**4-RESULTS ORIENTATION**
• Learns from others (mistakes and experiences) • Strives to be an excellent leader • Gives high priority to PMP course • Provides practical support • Provides ongoing feedback for activities and members' personal development and follows up members' development • Asks insightful questions to foster members' learning	• Demands high performance • Gives others liberty to decide how to do their own work • Confronts problems immediately • Develops and communicates clear, measurable, and objective standards and does not shy away from evaluating others' work

[1] Those behaviors are grouped together because it was not possible to group them with the other group of behaviors.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

1- AS A LEADER

Is an inspirational, motivational, and encouraging leader

From the very beginning of the project, L1 inspired her members by promoting a sense of ownership among the team regarding their work. She made it clear that the members were working for themselves (see the journal excerpt below).

> *I would not like the members to think that I correct them like a professor, I try to make it clear that they don't work for me but* ***for themselves and for the clients****, I just help them to do a good job.*
>
> From her 1st entry to the journal

Additionally, she asked questions to determine whether or not the team members understood the importance of the project (see below).

> *When the meeting started I asked them how they saw the project, if they had reflected on what they were doing here, what they could obtain from the project, what they could provide to the others.*
>
> Journal entry from the 5th week

When things got tough in the project (when members were tired or concerned) she encouraged them by pointing out the importance of their work for their project and for their future.

> *Drake told me that he was concerned because they were taking a lot of time. The others gave the same opinion "they spend too much time on the project and they can't study their other subjects". I told them what they were doing was good and that they should not worry because the time they were investing now would be much more beneficial for their future.*
>
> From the entry made on the 5th week

> *Steve told me: "I can not do it anymore. You (the leader) have corrected the reports 30 times and we have also reviewed them but she still finds things to correct". I told him to have patience and that it was better to ensure that everything was correct. I told them that it was for their own good and it was their report and they were doing their task very well.*
>
> Journal entry from the 8th week

The above mentioned behaviors seem to reflect the leader's intention of articulating a clear vision and mobilizing the members toward this vision.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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1- AS A LEADER

This characteristic of L1 might be explained by her "authoritative" managerial style, a style that is intent on mobilizing people toward a vision.

The journal excerpts presented below demonstrate how important it was for L1 to motivate her team members. To increase the members' motivation she prepared a visit to the laboratories, set an example (role modeled) and used real life stories to demonstrate the importance of certain behaviors.

> *When I told them that if they wanted, we could go to see the laboratories which held the equipment used in their process; I could see that they were motivated to go. I think this will be positive for their learning and motivation. I know I repeat this word (motivation) a lot but I think it is essential.*
>
> Journal entry from the 2nd week

> *I have to motivate him and make him get more involved. I knew it from the first day.*
>
> Journal entry from the 3rd week

> *The members' grades are not important for me. However, I would like them to get good qualifications because I know this is what would motivate them.*
>
> Journal entry from the 8th week

> *However, the only things I know how to are to give them feedback on their behavior, advise them how to improve and lead by example. I often use personal and/or real life stories to make them see the importance of certain behaviors.*
>
> From the entry made on the 10th week

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

1- AS A LEADER

Is aware how her actions as a leader will impact others

L1 was aware about the impact of her behaviors on others. For instance, the leader knew that through her actions and behaviors she was setting an example for her team members.

> *Today we had a team meeting with the members. I arrived a little later than usual….I was worried about arriving late because if I am late, I can't very well criticize someone else for doing the same. Anyway, I had no reason to be nervous because it was still only 12.10 o'clock when I arrived. .*
>
> From 1st journal entry

In addition, the leader was conscious of the impact of her behavior on the team's development. She was aware that her actions at the beginning of the project would shape the members' perceptions of the project. Similarly, she knew that her behaviors would be a critical factor for the team's development when the team was in the storming stage.

> *I think that what they (the members) interpret from these first weeks is essential.*
>
> From 1st journal entry

> *I notice that I am at the storming stage. I hope it won't last long. The truth is that I am feeling some pressure because I feel that my movements and actions are now key to the evolution of the team.*
>
> Journal entry from the 6th week

Moreover, the leader was aware that the way she said things would affect her members. For example when she wanted to urge her team members she tried not to put stress on them at the same time.

> *Over the weekend and in the meeting today, I wanted to convey a sense of urgency without transmitting stress because that would not be very positive.*
>
> *Charlotte said she was going away for the long holiday. I said: "are you going away for the entire holiday" showing my surprise when I should not have done. I just said it without thinking what her answer would be. I should have been indifferent. I should have worried about them finishing their work. However, the fact is that those who aren't going away will work harder.*

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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1- AS A LEADER

> *This is the first time that this has happened so they won't say anything because they are motivated but if it happens again they will get angry. I know from experience that these are difficult problems to solve.*
>
> Journal entry from the 8th week

Additionally, the leader was very careful about the timing of the things she wanted to say to her team members. She chose moments when she would not adversely affect the members' concentration, motivation and attentiveness (see below).

> *In the end, I have not spoken to Steve* (the leader would confront his behavior). *I wanted to do it but I did not think* ***it was the right day****. He was finishing the B.E. Talking to him would have caused him and his peers to lose concentration.*
>
> *I want to talk them individually and together. However, not now. This is not the right moment to do it instead I will wait till the end of the semester… …..I won't say anything now* ***because they need to be motivated*** *but when we review the first semester we will speak about their involvement during this period..*
>
> Journal entry from the 8th week
>
> *I told them their grade for the planning (4.65) almost at the end of the meeting because if not they would not have been attentive during the rest of the meeting.*
>
> Journal entry from the 14th week

Is a self-aware leader

L1 was aware of her natural inclinations and tendencies and her emotions. She was conscious of her high level of exigency for herself and for others (see below).

> *I wonder if I get too much involved or I do more than what I am responsible for. I don't think that I get of the boundaries of my role but often I tend to involve myself too much in what I do.*
>
> From her 1st entry to the journal

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

1- AS A LEADER

The high demands that L1 placed on herself and her team members can be explained by her "shaper" role preference because shapers tend to be demanding.

> L1 wrote the following about her reaction when Charlotte told her that she was going away during the holidays.
>
> *I know that the monitoring team will not evaluate me highly on self-control today. I know I have to control my expectations but today I have not done that. This might be because the work pushes or because I am tired and it is difficult for me to concentrate. I need to concentrate hard not to make comments like this.*
>
> Journal entry from the 8th week

L1 also knew that she was not inclined to speak about her feelings and that she tended to avoid asking personal questions because she did not like speaking with others about her private life. These characteristics can be explained by her "introversion" preference because introverts tend to be more reserved.

> *The truth is that it is an effort for me to write about certain feelings, because I'm very reserved about some things. I hope I will get used to being more open when writing this journal.*
>
> Journal entry from the 2nd week

> *I did not get into the habit of speaking individually with them* (members) *on a regular basis during the first semester because we did not have time and I did not want them to feel "controlled". I suppose it is because of the way I am. I don't like talking about my private life and that is why I never ask direct questions or about anything that might be personal.*
>
> Journal entry from the 12th week

The leader was also aware of her emotions and she understood which emotions were stoked by which situations. For instance, she felt angry because she thought that her team members were not sufficiently involved in the project. She explained that the fact of seeing the members of another team working on the project might have made her feel more concerned.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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1- AS A LEADER

> *Maybe I have been more concerned this week because the members of another team have been working on the structure in the library every afternoon and one afternoon they even cried because they were unable to do it.*
>
> Journal entry from the 4th week

Later on, the leader felt very angry because she wasn't able to finish all the work she had. She investigated the reason why during the reflection process and concluded that she was feeling tired because she had dedicated all her time to her studies (the first entry presented below). Her tiredness had affected her performance in the team meetings (the second and the third entry presented below).

> *I wanted to write to the journal but it was impossible. In previous years No matter how much work I had, I was able to do it, even sacrificing my free time and sleep. But this year, I am not going to English or German classes, I don't have time to prepare myself meal or clean the house. I only sleep 6-7 hours but I still can not finish everything. I want to do things right, I want to learn but with this stress I can't pay attention to everything…… The truth is that I have been feeling very frustrated for some weeks because I haven't been able to get the job finished. I have been thinking: Am I stupid? Do I find it difficult to learn or understand things? My conclusion was that for the last four years I have dedicated all my spare time to my studies and every year it gets worse, I feel unmotivated. Or more precisely, I am tired.*
>
> Journal entry from the 6th week

> *The truth is I am not very proud of the meeting today. Not that it went wrong it is just that I was not 100%. I have been very busy all week and I haven't slept very much.*
>
> Journal entry from the 5th week

> *Today the meeting has not gone badly, but it was not one of those days where I feel satisfied. Firstly, I was very tired and I was not motivated for personal reasons. This means that inevitably I was not 100% in the meeting.*
>
> Journal entry from the 15th week

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1-AS A LEADER

Practices emotional self-control

L1 was able to control herself emotionally. She got angry with her team members several times throughout the project. This anger might be explained by her preference for the "shaper" role as shapers are prone to frustration.

However, as a leader, she controlled her negative feelings and responded constructively to the members; she knew she would not gain anything by getting upset with her members.

Jonathan told the leader that if her seminar about EES and Word was going to be long he would have to leave early because he wanted to go back to his home town.

> *I have great difficulty in finding even one hour to prepare the seminar. However, I can not get angry with him because I would not gain anything by it. Instead I told them what I intended to explain in the seminar and said that if anybody thought that they were familiar with the subject, they need not waste their time by attending the seminar.*
>
> Journal entry from the 3rd week

The members did not finish the tasks on time.

> *It makes me angry that they don't make good use of time. ….. I was thinking how to focus last Tuesday's meeting so as to address this issue. I did not think I would gain anything by getting angry with them.*
>
> Journal entry from the 4th week

Noe noticed an error in the project. The leader suggested that they prepare a corrected report. One week later, the leader discovered that they still had not done anything about it.

> *On seeing their passivity, I had to bite my lip. I thought "whatever you say, don't vent your anger, instead make them see that they have not acted correctly." Anyway they noticed that I was upset. I told them that I was surprised that not of them act to rectify the mistake in the project.*
>
> Journal entry from the 10th week

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1- AS A LEADER

Is a leader of integrity

The following journal excerpts illustrate that L1 has a strong foundation of integrity. She confronted dishonesty; she treated and evaluated others justly; she did what she believed to be true, she taught the members to act with integrity.

> *Another thing to emphasize (which I did not like very much) was something that Jessica (another leader) explained. It seems that her team always gossip about the other teams. I do not understand why she does not stop them; she should not allow them to speak about others, at least during meetings. Meetings are for speaking about other things.*
>
> Journal entry from the 6th week

> *He (another leader) came to ask me and another leader about the parts of the process, basic things such as the reactor, which my team members were clear about by the third week. I told him that this was very well explained in Ullman and that he should advise his team members to read it. He said that he could not say this because he had never looked and would never look at a book. I told him that first-year students should learn to look for these data in the bibliography (literature). He told me that he would not look for data in a book because it was a waste of time. He looked for data on Google and then told his team members. I told him that he was not acting right. He said that he worked for one of the 10 best companies and he saw that the best companies earned money by stealing. I told him I did not agree with that. I told him that the fact that a lot of people earn money dishonestly was no justification to act in the same way and that just because someone else acting badly did not mean that we had to descend to his/her level. I think you have to have your own principals and you should follow them even if it is not easy.*
>
> *Charlotte and Noe told me that physics activity had been done badly so they redid it with Jonathan. Noe told him that the work was bad and he responded to her "if you wish you can do it, I have spent a lot of time and I don't want anything more to do with it." I did not speak to him at the time because I did not want him to know that Noe told me about it. I did want to judge the situation without knowing both versions.*

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1- AS A LEADER

I am afraid of not evaluating them fairly. For me, the most important thing is to be fair but I am finding it difficult. I have to think a lot. I have been writing down incidents as they occurred, how they delivered the work etc., but I can't find any big differences between them and I don't want them to end up with the same grade. It is never fair because you can never get all 6 people in a group to act and work to the same degree 100%.

Last night I could not sleep for thinking about them. I am very uneasy, I don't know why. I have seen worse situations and in any case it is not my job to finish the task. But I can't do any more. I could do what the other leaders do. I could do the task or write the reports, which is easier and faster and you ensure that they finish on time and are well done. But I will not do that.

Journal entry from the 8th week

The members speak about Charlotte when she was not in the meeting.

I tried to get them explain to me exactly what had happened but they would not. I did not want to insist either because I had tried to make them understand that one does not speak about a person behind his/her back because it is disrespectful. I told them that they could talk about it when she was present.

Journal entry from the 5th week

I explained to them how the rating system worked and I told them they should do what they thought and not what I said. But if they wanted my advice, I told them that I believed that they should be fair, and yes that meant giving different ratings. I also told them that it was important to be sincere. I advised them that the ratings should not be kept in secret but shared openly so could be justified. I think this is the most fair and honest way to act and that is why I advised them to do it.

Journal entry from the 9th week

The leader's integrity might be explained by her "ISTJ" type because ISTJs place great importance on honesty and integrity.

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2-TEAMWORK

Takes responsibility as a leader and positions self as one

One of L1's most important characteristic behaviors was taking responsibility as a leader. The three passages below illustrate L1's sense of responsibility for her team; she held herself responsible for the team's results and achievements.

> *Three days before the end of the project and they have finally become aware of the deadlines and the tasks they have before them. …I feel partly responsible.*
>
> Journal entry from the 8th week

> *I felt good to see that they had delivered the project on time without running around at the last moment and working all night. … In part, I feel responsible because the team, in my opinion, would have had problems without my intervention; none of them has initiative or shaper characteristics.*
>
> Journal entry from the 9th week

> *I have got the members to come to the meeting prepared and to take it very seriously. I believe that the team will not reap these benefits if the leader does not sow them.*
>
> Journal entry from the 14th week

> *I felt a little proud or happy to see them working together with concern for work. Because I partly feel responsible.*
>
> Journal entry from the 18th week

L1 stood up as a leader when the difficulties and problems arised in the team. She positioned herself as the leader and took the personal responsibility for correcting the problems and improving the competences of her members.

> *The planned activities were not completed (neither the structure nor the BM). I told them that they had one week and they should take advantage of the 4 day break. I was unable to convince them so they divided the task amongst themselves…Thus,* ***my mission now is to make them see*** *that they can't keep on dividing up the work and working when it suits them because the project requires more involvement and sacrifice.*
>
> Journal entry from the 4th week

Noe explained to L1 that the other members did not want to work with her in the library.

I advised her to keep working as before, be patient and not get discouraged because her colleagues would realize their mistakes. ***This will be my job****. As a leader, this is a challenge to overcome and this can be a very good thing. As a team it would be better not to have them (although I think it is inevitable).*

Journal entry from the 5th week

*Actually these are very important competences for teamwork however many members have not developed them. …****It is my job to develop these aspects****.*

Journal entry from the 14th week

The way L1 positioned herself as the leader might be explained by her "authoritative" management style because such people are able to take charge.

Assesses appropriate approach for leading

The other characteristic behavior of L1 was her ability to assess the appropriate leadership approach depending on the requirements of the situation, as is seen in two examples below.

Jonathan (along with the others) came to tell me that the Q.I professors had told them that they still were allowed to start work on some of the objectives. They wanted to ask me what they should do instead. I could have told them that they should find it out by themselves (as this is an objective of the project) but instead I told them to get on with other things for the time being. I chose this option because it seemed the most feasible at the time.

Journal entry from the 4th week

They have a lot of things to do. For this reason, I thought it would be a good idea to intervene and establish some daily objectives, if not they will be working until 6.0 o'clock Wednesday morning (the delivery date)*. I did not want it to get to this point, I have restrained myself so far, but I had to intervene with only 5 days to go before the deadline.*
Today was not a day for experimenting or learning. I thought that everybody should be getting on with what they do best so they could get everything done more quickly.

Journal entry from the 8th week

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The second situation presented in the previous page demonstrates L1's switch between managerial styles; from "authoritative" to the "coercive" in an urgent situation (5 days before the project delivery). She believed that the situation required telling members what each of them had to do (coercive style). She was convinced that it was not the moment to experiment with new things (authoritative style).

Does the right thing for the team even it is difficult for her

L1 did not find it easy to demonstrate some of the leadership behaviors. However, she consciously pushed the limits of her comfort zones by acting in ways that were not natural or easy for her. It was difficult for her to speak with other people about personal issues. However, she did it because she believed it was necessary for the well being of the team and its members.

> The leader noticed that Jack was very silent and looked preoccupied during the team meeting so she had a word with him.
>
> *If he had not been a member of my team, I would not have spoken to him because I find it very difficult to talk to people about personal matters. I was embarrassed but I did it anyway because I felt obliged and now I feel better for having taken the necessary action to earn his trust and to ensure the smooth functioning of the team and the welfare of its members. I do not want Jack to get unmotivated; I believe that he adds a lot value to the team.*
>
> Journal entry from the 4th week

> *I have noticed that talking to the members individually is very useful; if not a lot of things can be overlooked. Nevertheless, I don't feel very comfortable in these situations; I have to force myself to be more open in this sense.*
>
> Journal entry from the 12th week

The leader also felt sorry when she gave a low grade to the members and she did not like penalizing the work that was not handed in on time. However, although she might not like it, she still did it because she believed that it was necessary for the team members' development.

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The leader told the members that their grade for the planning was 4.65.
At that moment I felt sorry, but I am convinced that I did it well. I will try to be less benevolent, they should be more mature and responsible and independent of me.

Journal entry from the 14th week

The fact is penalizing the work that is not delivered on time works. I don't like this system, but it works.

Journal entry from the 16th week

The leader's effort to act in the ways that were outside of her comfort zone might be explained by her "ISTJ" type. ISTJs have a strong sense that allows them to overcome their natural reservations.

Trusts her team members and demonstrates this trust

The leader trusted her team members and she explicitly demonstrated this confidence explicitly to her team members.

I hope and trust that he will change his attitude or the rest of the members will be negatively influenced by him (Speaking about Steve).

Today is Tuesday so we had the meeting. Yesterday, they sent me the completed activities as agreed, except for the activity that Noe was responsible for. Today she told me that she had not understood that she was supposed to send it to me. I believe her, but I was surprised because we have done this since day one.

From her 1st entry to the journal

I know that this kind of calculation can not be done well the first time round. Therefore, I suspect that they had not calculated it seriously. But I wanted to have confidence in them and not be negative so I will wait until tomorrow to see what they hand in.

Journal entry from the 4th week

I made it clear that I trusted them and that I thought that they were a good team (I really think this) and that I knew that they were very hard workers (some more than others).

Journal entry from the 6th week

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2-TEAMWORK

Promotes communication and participation in the team

In the analyses of L1's perceptions regarding her team members demonstrate that L1 thought that her team members were not participative or communicative in the meetings. She made it clear from the beginning of the project that the members needed to communicate with each other.

> *I have made it clear to the members that they must communicate with each other because I have noticed that they have done tasks in parallel.*
>
> From her 1st entry to the journal

She also created situations in which the members needed to communicate with each other.

> *The meeting was held on Wednesday because Charlotte needed to go to a funeral. I said that if she'd agree it with her colleagues, I had no problem meeting another day. The truth is that it was not very important for her to be present at the meeting. I can understand if she can not come and provided that she lets me know. But I told her to agree it with her colleagues so that she would have to communicate with them. They find it very difficult to talk among each other and to meet up, so I left it in her hands. It worked; she called them and they met on Wednesday at 13:00 o'clock.*
>
> Journal entry from the 14th week

She used questions in the meetings to make members participate. In an exemplary incident, the leader was asking the members about the project; when she asked Noe for her opinion, Noe responded that she agreed with the other members. At that point, L1 writes:

> *I insisted that she say something different about the project.*
>
> Journal entry from the 5th week

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2-TEAMWORK

Unites members as a team

The leader recognized that her members were acting like individual people rather than a part of the team, so she tried to unite the team members by having lunches and dinners altogether as a team.

> *We stayed behind on Friday afternoon to have lunch together.*
>
> Journal entry from the 6h week

> *As we were meeting at 10 o'clock, I brought cakes in case they hadn't had breakfast and to create the sense of team and companionship that is a little bit lacking.*
>
> *I proposed having lunch together to celebrate the handing in of the project (I am always trying to bring them together as a team).*
>
> Journal entry from the 8h week

> *Yesterday we all went to have breakfast together, except for Noe.*
>
> *The members of the "I Have a Dream" team a little get-together. I told them we could have lunch with them and some members went along.*
>
> Journal entry from the 21st week

Is sensitive to members' problems and acts immediately to solve their problems and conflict in the team

L1 was very sensitive to the members' problems. When she felt that a member had a problem, she immediately acted to determine what it was. When the problem concerned an individual member, she talked in private with the member in question. One example is illustrated below.

> *The second aspect of the meeting that I want to comment on is Jack who is usually the most participatory member. He was quiet and looked preoccupied. I was afraid that he was worried because the work was not finished, maybe he felt bad because his colleagues hadn't finished their part of the work. I felt I had to talk to him in private. When I could, I asked him. He said that he was not feeling good in the meeting but nothing had happened with the team. I calmed down because there were no problems with his colleagues.*
>
> Journal entry from the 4th week

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However, when a members' problem was related to the whole team she did not hesitate to bring the problem into the open and solve the conflict in the team. The following is an illustrative example.

> *I heard Noe talking to Jonathan (possibly about the activity they were doing together) and I noticed that something was happening. I went to Noe and asked her what had happened. She started crying and wanted to leave. I told her to calm down and speak about it. We talked for over 1 hr. She said that nobody she had to work with wanted to stay with her in the library. I insisted that it was not something personal, but that her colleagues were just not in the habit of working as a team (which I knew to be true, I try to correct it, but nothing I do works). She felt bad, because she wanted to work with them thinking it would be better if everyone talked but nobody wanted to stay. She also said that sometimes she felt offended because she worked at home, she asked the professors and but when she wanted to explain what she had found out, they would not listen to her. I have also noted that they do not know how to listen, especially Jonathan. From that moment, I realized that Tuesday's meeting needs to be different; I have to make them see that they are not working well as a team. For this reason, I am trying to think of things that will make them reflect on this.*
>
> *I have the following ideas for the meeting on Tuesday.*
>
> - *I will start by saying that I have not prepared the meeting or corrected anything (it will not be true). I will tell them that they have to stay 1 h and that we will speak during the weekend. Let's see how they react. I will then tell them that it is a joke that they should not get angry with me for not fulfilling my obligations. I want them to see that everybody depends on each other.*
> - *Review of working practices (Gantt, calendar, etc.) I want them to give their opinion about why the work falls behind. We will make a list with their reasons. It should come to light that they don't coordinate as a team (I think it is the principal problem).*
> - *Review of team functioning. We will note the team's strengths and areas for improvement.*
> - *Reflection on individual behavior. I want to remind them of norms! Because I don't want it to look like I am telling them off but I want them to realize how they are acting.*
> - *Establish balance of consequences for the norms.*
>
> Journal entry from the 5th week

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2-TEAMWORK

The amount of thought the leader put into solving the problem withthe team can be observed from the journal entry in the previous page. From the entry below, it can be seen that the leader did not hesitate to act; in the very next team meeting she brought up the issue and made the members see that they were not working well as a team.

> *I wanted to explain how the meeting went yesterday. My goal was to make them see why the activities were falling behind. I had my opinion, but I did not give it, but I suggested that they should give their opinion of why they did not finish on time. They said everything I had intuited. I felt good because it showed that I was not wrong. In short, they are not well organized and there is not enough teamwork. They prefer teamwork. The essential weak point detected was that they did not work as a team. I think I managed to make them to see that.*
>
> Journal entry from the 6th week

The leader's genuine interest in her team members' problems can be explained by her "benevolence" value because people with this value try to enhance the well-fare of those with whom they come into frequent personal contact.

Gives recognition and positive feedback

The leader provided positive feedback and recognition when the activities were resolved correctly and when the members took initiative to: work together, review the work of others, suggest new ideas for the project, and when they demonstrated a behavior change.

> *Another issue I brought to the meeting was the quality of the activities. I congratulated them because the activities were resolved correctly.*
>
> Journal entry from the 5th week

> *Today in the meeting I told them that it was perfect to review the work of colleagues because every one could make mistakes.*
>
> Journal entry from the 8th week

> *One thing that surprised me very positively and made me very happy was to find them last week in the library redoing the balance that they did badly. I could not believe that they were working together with their own initiative. I told them that it was very good.*
>
> Journal entry from the 11th week

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2-TEAMWORK

> *I went to the library to study. At 12 o'clock all the members arrived to work on the project…I have to remember to congratulate them for this, it is very good that they make good use of time.*
>
> Journal entry from the 15th week

> *When I spoke to them individually I congratulated Jonathan for his change of attitude because he is much more involved in the project and works better in the team. I have encouraged him to continue like this.*
>
> Journal entry from the 18th week

Again L1's this behavior may be explained by her "authoritative" managerial style because people with this style provide balanced feedback to the people.

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3-COMMITMENT TO LEARNING

Learns from others (mistakes and experiences)

The leader sustained her personal growth by being open to learning from the experiences and errors of others. See the related entries below.

> *I remember the team meetings I had when I was a first-year student. I was bored and I thought that they were a waste of time. I don't want my team members to see our meetings like this.*
>
> From her 1st entry to the journal

> *This morning I received an email from my tutor, congratulating me for the Team Charter. I felt good and this gave me and idea. Jack sent me the PFD. I had thought about giving them feedback in the meeting on Tuesday, but instead I will answer him, saying that it is good, much better than before.*
>
> Journal entry from the 3rd week

Strives to be an excellent leader

The leader strove to be an excellent leader. She therefore dedicated time and effort to preparing her meetings, reading books about leadership, and preparing her seminars for her team members. In her journal, she explained various times how she woke up during the nights thinking about her team members, the meetings and the project.

> *I hope that I don't lose my motivation for leading this team. This is why **I dedicate so much time** to preparing meetings, seminars, and reading books about leadership when I have some time. I don't know if my efforts will bear fruit or not, but the challenge of forming a good team and developing myself as a leader motivates me and I would not feel motivated doing a mediocre job or by passing the PMP course to get of trouble.*
>
> Journal entry from the 2nd week

> *I went to the library to look for the book of Covey. I hope to have time to read it. I picked up a book I saw by chance: "Manage Your Time". **I want to see if I can find something useful for Charlotte and Jonathan**. I notice that the quality of their work suffers because they can't find enough time…..I want to see if the book has anything useful for them and for the others (and perhaps for me too).*
>
> Journal entry from the 3rd week

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3-COMMITMENT TO LEARNING

> *I have made a mistake in writing the journal before going to sleep because now I will start thinking about the team and I won't be able to sleep. Recently,* ***I have been waking up after dreaming about the project and about them****. I ask myself how the team would function if they had a leader who did not care.*
>
> Journal entry from the 12th week

Gives priority to PMP class and applies the techniques thought in the class

The following sentences reveal the particular importance of the PMP course for her. She was very motivated by this course and she believed that it taught her very important things for her personal life. She also put into practice the things raised during this course.

> *PMP is such a priority for me that I stopped studying my other subjects. However, I am still unable to dedicate all the time to PMP that I would like. .. We have to do everything so fast to meet the deadlines and to pass that I don't think we learn anything. We have no time to reflect on what we do, or to retain knowledge. I find this PMP course very motivating whereas the other courses are much less so because I don't feel they improve my general levels of competence..*
>
> Journal entry from the 6th week

> *For several days I have been thinking about how this course is teaching me many things that I can apply in my personal life (apart from technical aspects such as facilitation, etc.). The most obvious is that I now listen more actively. When I read in class the transparency about the symptoms of not listening actively, I realized that most of them applied to me. Since then I have made more of an effort to concentrate on what people say to me…. And I realized that I have missed out on many things through not listening actively to people.*
>
> Journal entry from the 8th week

> *I felt good today; I feel that the meetings have improved because of the effective facilitation techniques I have put into practice.*
>
> Journal entry from the 12th week

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COMMITMENT TO LEARNING

Provides practical support

The leader helped the team members to perform project activities by providing them with practical support about the computer programs and by preparing them a seminar for them on the use of these programs. During the course of the project she suggested which program they should use to carry-out the project activities.

> *When it was mentioned that we needed to start the BM activities, I told them that it could be solved using Excel and EES. Jack said with EES. The others however, made a face that implied: "we do not want more work." I told them to decide. And if they need EES, I would tell them where they could get it and give them a seminar explaining how to use it. I am not sure how to act in these situations. On the one hand, it is clear; I should teach them EES so they can use it if they want. On the other hand, as the leader of 6 people perhaps I should listen to the majority. I can not demand the same from them as I would demand from myself. In any case, I think I will prepare a seminar on EES…. If they do not use it now they will at least ne able to use it later on.*
>
> From her 1st entry to the journal

> *On Friday we met for the seminar on Word and EES (they were all very interested).*
>
> Journal entry from the 3rd week

> *I saw the team members in the library. They were redoing the balance they had done badly. I suggested they put it in Excel so that they could be sure that it was in good order and be able to change it if necessary. Jack did it which was very pleasing to see!*
>
> Journal entry from the 11th week

Provides ongoing feedback for activities and personal development and follows up members' development

The leader provided ongoing feedback on both the project activities and on the members' personal development. The leader understood the importance of her feedback to the progress of the project.

> *If I don't give them feedback about all the activities and if we don't plan the week ahead we don't advance.*
>
> From her 1st entry to the journal

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3-COMMITMENT TO LEARNING

Through her feedback, the leader tried to show the members which aspects of the activities could be improved.

> *On Tuesday, I will give my feedback on the things that are not clear or that can be improved.*
>
> Journal entry from the 3rd week

> *Today, I told them we would revise the completed activities to make sure everything was properly finished and to redo the things that could be improved.*
>
> Journal entry from the 18th week

The other objective of the leader's feedback was to enable the members to learn from their mistakes and to encourage them to be critical of their own work. She encouraged the members to give feedback to each other about their work.

> *I don't like giving them feedback by telling them what was good or bad. I prefer to keep asking them to make them see their own mistakes. I think it is more effective, less boring and more educative and gives them the opportunity to talk rather listen to me (I would prefer not to be the one who speaks most in the meeting, but that is how it is).*
>
> *At the end of the meeting, I was happy because Jonathan said: "it is very good that you correct us so much because this way we can learn which mistakes we have made and not repeat them." He had understood the reason behind my feedback, which is what I wanted to achieve.*
>
> From her 1st entry to the journal

> *I try to explain them that I do not correct to give them a grade, but to enable them to correct and learn from their own mistakes. Therefore, today I have also suggested to them that they evaluate their own activities and reports on the basis of the parameters I use (they can find these in the Team Charter and I have explained how I use them in detail). I told them this because I thought it would be a very good way for them to be critical of their own work and to avoid writing mediocre reports. I also made it clear how I evaluate the work they do. Anyhow, today I succeeded in getting them to give feedback before I did.*
>
> Journal entry from the 3rd week

> *I do not want them to depend solely on feedback; I mean that they have to learn to be critical and demanding of their work.*
>
> Journal entry from the 5th week

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

She also corrected the things that she knew that the professors would not check or grade in the project. She did this because she wanted her members to learn to write better.

> *Correcting and sending reports on everything that can be improved, mistakes, etcetera takes up a lot of my time. I don't correct but I highlight in blue and I explain why that verb is not correct or why something is not understood. We all lose more time, but they learn more, I think. I could see that if it is explained to the members they learn and don't repeat the same mistakes in the following report. [Frankly I correct things that I know the professors will not see and which don't count as part of the grade] But no matter, they now know to write a little better.*
>
> Journal entry from the 8th week

Apart from giving feedback on the project activities, L1 held two individual coaching sessions with the team members (one in the 1st semester and one in the 2nd semester) to identify the areas in which they could improve and to create action plans. In the second coaching session, she provided feedback to the members to tell them if they had improved or not.

The feedback L1 provided to her team members may be explained by her "authoritative" managerial style because people with this style provide balanced and ongoing feedback.

Asks insightful questions to foster members' learning

The leader asked insightful questions to facilitate learning and understanding. One example is illustrated below.

> *When giving feedback today, I realized that they had not understood what I had told them so I asked them a question: "if you were engineers and if you wanted to build this plant, you would be interested in studying the reactions. Why?" Charlotte responded: "we would like to find out how the process would function better". I asked her "do you think that this report reflects the things you do to improve the process". At this point she herself noticed that she lacked the connection between the theory and the reality. I think it is important for them to learn to think things through from this standpoint.*
>
> Journal entry from the 1st week

ISBN:978-84-693-5423-0/DL:T-1414-2010

4- RESULTS ORIENTATION

Demands high performance

The leader's demand for high performance can be best illustrated with the following entry:

> *Jonathan told me "We can't obtain a grade higher than 10". I realized that maybe I was being too demanding but I think I have to be. I want us to go as far as we can. When we are carrying out an activity I suggest possible improvements to see if they accept. However, there are activities that can be still improved.*
>
> Journal entry from the 7th week

L1's high demands may be explained by her preference for the "shaper" role because shapers like to challenge others.

Gives others liberty to decide how to do their work

The leader gave her team members the freedom to to decide how to do their work and thus encourage them to take the initiative. She let them do the planning (deciding who should do what) and let them design the poster according to their taste.

> *Normally, in order to give them freedom and initiative, I avoid influencing the details of who should do what.*
>
> Journal entry from the 9th week

> *…..therefore, I have given them the freedom to prepare it (the poster) according to their taste.*
>
> Journal entry from the 10th week

Here L1's behavior could be explained by her "authoritative" managerial style because this style gives people a lot of freedom and flexibility to innovate and accomplishing their goals.

Confronts immediately

The team members occasionally exhibited undesirable behaviors. The leader immediately confronted these non-productive member behaviors. On one occasion, Jonathan did not do his share of the work and held Steve responsible for it.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

4-RESULTS ORIENTATION

> *Jonathan delivered the report half corrected without annexes. In addition, he removed algebra part for no apparent reason and in the meeting said that it was Steve's fault (he had not said anything to Steve). At that point, I decided that I could not overlook this. I told him that he could not hold his colleague responsible for something that he had not done. I said that I held everyone equally accountable for the activities but that each of them should be responsible enough to finish his/her part and to commit to completing the activity and they should not leave it half done and expect somebody to finish it.*
>
> Journal entry from the 7th week

Steve's laugher and jokes during the meetings became a concern for the leader. In addition to these, Steve missed a team meeting without telling the team. He did not come to the meeting because he had gone out the night before and overslept the following day. The leader was clear that Steve had to be shown that his behavior would have consequences.

> *When we were reviewing the finished activities I suggested some possible improvements to them. Steve reacted with smiles and comments. I asked him what the problem was and, he said "nothing, nothing." I do not want to let these situations go unchallenged so I insisted: "What? If you disagree you can say so openly and we can discuss it among us". He told me that he found the work too much. I said that I was not proposing a large amount of work and that I was only recommending ideas for improvement. The rest agreed to do the suggestions, or at least did not show opposition.*
>
> Journal entry from the 7th week

> *Steve worries me. He laughed all through the meeting. This happens a lot but today he laughed at everything that was said. When he laughs I don't let it go unchallenged. I always stop and ask "what are you laughing at", but he always gives the same answer "nothing, nothing". It reached the point where I became serious and told him to stop laughing because he was distracting the meeting.*
>
> *Steve did not come to the meeting and he did not get in touch until 16 o'clock* (he had fallen asleep)*. I have to talk with him on Monday. He obviously needs to be told that his attitude is not beneficial for the team and if continues there will be consequences….I now have to think of what feedback to give to Steve and what the consequences of his behavior should be. He will definitely think that I am exaggerating but I think this is important. It must be made clear that his attitude will not be tolerated.*
>
> Journal entry from the 8th week

ISBN:978-84-693-5423-0/DL:T-1414-2010

4-RESULTS ORIENTATION

In another case, the team members did not do their job as they were supposed to. They had to send the planification to the leader for feedback but when they did, it was a day late and the leader realized that it had been copied from the memorandum. In the following excerpt the leader confronts members regarding their underperformance.

> *We decided that they would do it the same way as they had done it the previous semester, but they found it easier to copy and wait for the leader to correct it…I have to give serious thought as how to act because this can't be allowed to happen again.*
>
> Journal entry from the 11th week

> *I prepared for the meeting very thoroughly because it was an important one (in my opinion). I brought a printed copy of their plan and started by asking them why we did planning. They said "to know what to do, to know when to do it, to know who does it." I responded "is that reflected in your planning?" They said "no". I reminded them that I didn't want to see it until they handed it in to the professors because my job was to tell them which points they could improve on, not to review and correct things that they should be doing. Later, I asked them if they were satisfied with their work and they said "no".*
>
> Journal entry from the 12th week

Develops and communicates clear, measurable, and objective work standards and does not shy away from evaluating others' work

The leader developed clear work standards and communicated them to her team members. Consequently, the members knew how their work would be evaluated.

> *Today I also suggested to them that they should evaluate their activities and reports on the basis of the parameters that I use (they can find them in the Team Charter) and I explained in detail how I do it. I also made it clear how I evaluate the work they do.*
>
> Journal entry from the 2nd week

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

4-RESULTS ORIENTATION

> *I said that I didn't want to see the planning until it was handed it to the professors. I told them that I was confident they would do it well; **if not there would be consequences**. Of course I will review it, but not before they hand it in. It is difficult for them but they have to face up to it because they rely on me too much. It is less risky if I go on a strike now rather than later.*
>
> *For now, however, they will receive quick feedback and it will serve (or should serve) them for the rest of the year. As I have to give them the grade, I have defined the points that I will be checking and what % of the grade I will give to each point. This way they can be clearer about what they have to do and my evaluation can be objective.*
>
> Journal entry from the 12th week

The leader's following sentences demonstrate that she did not shy away from evaluating the member's work. She had no problem giving a low or high grade. When she evaluated the planning for the second semester, she gave a grade of 4.65 and demonstrated that low performance would not be tolerated and would have its consequences.

> *When we* (the leaders*) met to create the evaluation system* (for the 1st year team members)*, many leaders commented that there were certain things they could not evaluate because they would have to give a "0" to everybody. I did not agree with this; if we believe it is important then it must be evaluated, and if that means giving a "0", then so be it. I do not mind giving either a "0" or a "10" if necessary.*
>
> Journal entry from the 8th week
>
> *In the meeting I basically gave them feedback on the planning. I have started by telling them: "I think this planning was done by two people in a couple of hours and the rest of the members have never even looked at it, am I wrong?" They were astonished and looked at me as if I was a fortune teller or something. I told them how I had been able to notice this. Noe asked, "will you mark us down for it?" with a frightened face. I said "yes", and I reminded them about the points I would evaluate and what percentage these would have. On Tuesday, I will tell them their grade which is going to be low. I am going to be very critical because I want to provoke them into reacting. If I knew that giving them a grade of 1 or 2 would get them working I would do it (especially because this mark does not affect them very much), but I have to be fair, I mean, I have to adhere to my evaluation criteria. Even so, I will try to be less benevolent.*

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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4-RESULTS ORIENTATION

I gave them the planning mark: 4.65. I found it difficult to give this mark so I went through it point by point (i.e. the points that I said that I would evaluate) and explained why I had given each mark and how it affected the overall grade. They all looked sad. I could see from their reaction that they weren't expecting this grade. On the other hand, they were aware that they deserved it. Jonathan asked me if the professors would correct it, if my grade was definitive, etc.., seeking ways to save the grade. I made it clear that, they have to be responsible for what they do; if they don't work hard enough, there will be consequences.

Journal entry from the 14th week

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

4.1.2.2. BEHAVIORAL EVENT INTERVIEW (BEI)

This section reports the results of the analysis of the behavioral event interview (BEI) conducted with L1. Table 4.7 provides the date, the location, and the duration of the interview.

Table 4.7: Behavioral even interview date, location and duration with L1

Date	Location	Duration
01.04.2008	Adolfo Roland Room	51.57 minutes

The results of the analysis of the BEI are presented in three subsections:

1st subsection: *Leadership Behaviors*. This subsection presents quantitatively those effective leadership behaviors coded in the BEI of L1 in terms of proficiency levels, competences, and the type of behavioral descriptors.

2nd subsection: *Qualitative Analysis of Critical Events*. This subsection provides qualitative descriptions of the critical events described by L1 during the interview and provides the leader's thoughts, feelings and actions regarding these incidents. This subsection also clarifies whether the critical events described in the BEI matched with those incidents described in leader's learning journal.

3rd subsection: *Other Interview Questions*. This final subsection presents leader's responses to the open interview questions regarding; (1) the past experiences that had helped L1 to perform the leader role, (2) what motivated her to take on the leadership role, and (3) the typical tasks she had carried out during a week when she was leading the project team.

(1) Leadership Behaviors in L1'S BEI

The interview section associated with the critical events was coded for the frequency with which the leadership behaviors occurred. The results are illustrated in Figure 4.3 together with the group of leaders.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

A total of 80 leadership behaviors were coded in L1's BEI (Figure 4.3). The frequency distributions of these behaviors across three leadership proficiency levels were as follows:

10 behaviors at level 1 (leadership without title),

63 behaviors at level 2 (team leadership), and

7 behaviors at level 3 (organizational leadership)

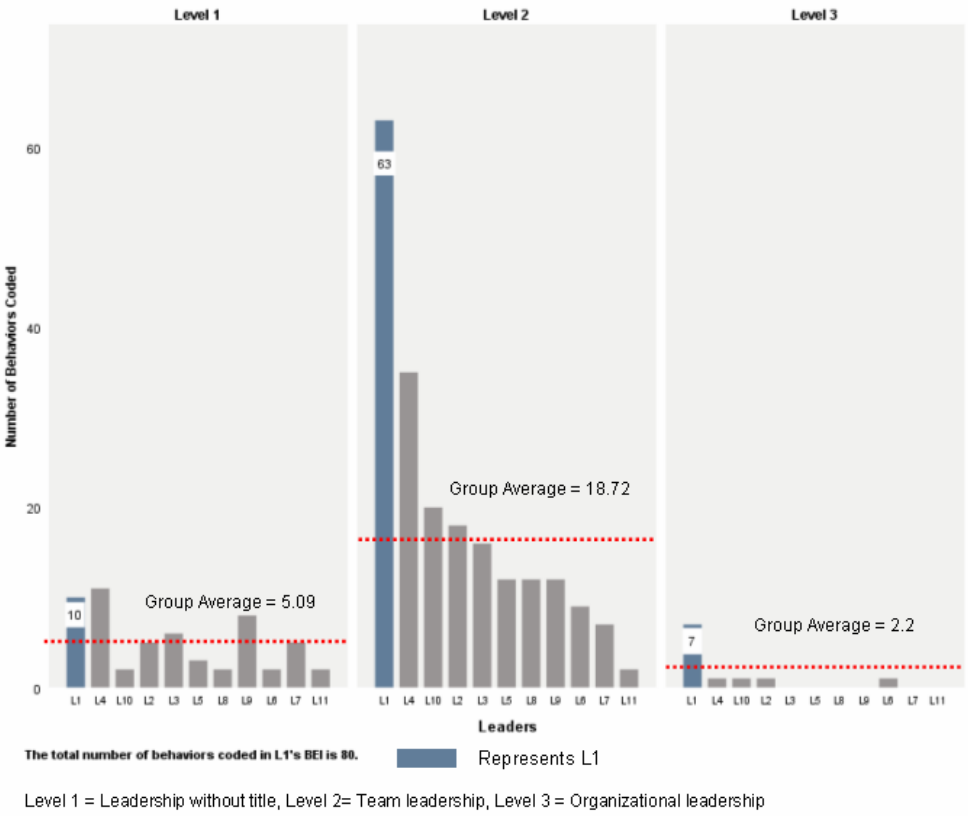

Figure 4.3: Frequency distribution of the 80 coded behaviors in L1's BEI across three proficiency levels of leadership and how this compares with the group of eleven leaders

The majority of the coded behaviors were at **team leadership level**. When compared with the group of leaders in the study, the L1's BEI contained the ***highest number* of leadership behaviors** coded at both *team leadership* and *organizational leadership* levels. The number of leadership behaviors coded in L1's BEI at leadership without title level (N=10) was above the group average (group average = 5.09).

ISBN:978-84-693-5423-0/DL:T-1414-2010

These results are consistent with those from L1's learning journal which also had the highest number of coded leadership behaviors at both team leadership and organizational leadership levels. In addition, the number of behaviors coded at level 1 in L1's journal was also above the group average.

From the data in Table 4.8, it can be observed that a **broad range of** leadership competences and behaviors were identified in L1's BEI. This result supports the results from the learning journal where the range of leadership behaviors coded was also shown to be broad.

The occurrences of these competences across three proficiency levels are summarized below. There were 3 competences that were identified at all three proficiency levels: "results orientation", "commitment to learning", and "integrity".

Competence	**The Levels Coded at**
Results Orientation	Level 1 - Level 2 - Level 3
Commitment to Learning	Level 1 - Level 2 - Level 3
Integrity	Level 1 - Level 2 - Level 3
Teamwork	Level 1 - Level 2
Responsiveness to Change	Level 1 - Level 2
Drive for Excellence	Level 2 - Level 3
Interpersonal Communication	Level 2

"Teamwork" and "responsiveness to change" were identified at level 1 and level 2, "drive for excellence" was identified at level 2 and level 3, and interpersonal communication was identified at level 2.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.8: The frequency distribution of the 80 coded behaviors in L1's BEI across the leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Responsiveness to Change		1	Adapts rapidly to new situations.	4
	Results Orientation		2	Acts to avoid an imminent problem or to benefit from an immediate opportunity.	2
	Teamwork		3	Demonstrates confidence and respect for others.	2
	Commitment to Learning		4	Puts into practice everything that she learns.	1
	Integrity		5	Expresses what she thinks and feels even in the knowledge that the message might not be well received by others.	1
	Total in Level 1				**10**
Level 2	Teamwork		1	Demonstrates caring leadership.	10
			2	Assesses and selects appropriate leadership approach.	3
			3	Confronts conflicts in the team in a timely and constructive manner.	3
			4	Creates an atmosphere mutual trust, confidence, and respect.	2
			5	Positions self as the leader.	2
			6	Facilitates the meetings.	2
		Total			**22**
	Commitment to Learning		7	Provides a balanced view of the strengths and weaknesses of others.	8
			8	Is committed to enlisting support for members.	3
			9	Asks insightful questions that facilitate learning and understanding.	3
			10	Provides timely and constructive feedback for development.	3
			11	Calms others in new learning situations.	1
			12	Helps the others to learn to solve the problems on their own.	1
		Total			**19**
	Interpersonal Communication		13	Convinces others by appealing to their interests.	3
			14	Demonstrates tact and diplomacy.	2
			15	Understands others' underlying needs, interests, problems and motivations.	1
			16	Presents logical and convincing arguments.	1
		Total			**7**
	Integrity		17	Confronts immediately inappropriate behavior.	3
			18	Treats others justly.	2
			19	Is ready to receive feedback about her behaviors towards other people.	1
			20	Gives or shares merit with whom really deserves it.	1
		Total			**7**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.8 - continued

Level	Competency		Behavior		Frequency
Level 2	Results Orientation		21	Manages performance.	2
			22	Readily adjusts plans to achieve objectives.	1
			23	Does not shy away from evaluating the work of others.	1
			24	Sets challenging achievable objectives.	1
		Total			**5**
	Drive for Excellence		25	Helps the others to generate ideas to make things better.	1
			26	Motivates others to participate in improvement activities.	1
		Total			**2**
	Responsiveness to Change		27	Considers the feelings of others during periods of change.	**1**
	Total in Level 2				**63**
Level 3	Integrity		1	Acts as a role model by demonstrating the organizational values.	1
			2	Defends what she believes to be true and necessary even it might not be popular.	1
			3	Answers questions with good intentions.	1
		Total			**3**
	Results Orientation		4	Demands high performance.	1
			5	Gradually increases the responsibilities of others.	1
					2
	Commitment to Learning		6	Encourages others to identify and share the best practices.	**1**
	Drive for Excellence		7	Instills a desire for continuous improvement in others.	**1**
	Total in Level 2				**7**

The number of behavioral descriptors identified in L1's BEI at different proficiency levels is summarized below. A total of 39 behavioral descriptors were identified in the leader's BEI.

Levels	**Number of Behavioral Descriptors**
Level 1	5 descriptors
Level 2	27 descriptors
Level 3	7 descriptors
In Total	39 Behavioral descriptors

It is encouraging to compare the data in Table 4.8 with those presented in Table 4.3 which shows the competences and the type of behaviors identified in L1's learning journal. Such a comparison indicates a good match between the learning journal and the BEI in terms of the competences and the type of behavioral descriptors coded in each tool.

ISBN:978-84-693-5423-0/DL:T-1414-2010

The match between the competences identified in L1's BEI and those in the learning journal is illustrated in Table 4.9. It can be seen that of the five competences identified in the BEI at level 1, four were also identified in the learning journal ("integrity" was not identified in the learning journal at level 1). Of the seven competences identified in the BEI at level 2, six were also identified in the learning journal ("responsiveness to change" was not identified in the learning journal at level 2). All the three competences identified at level 3 in the BEI were identified in the learning journal.

Table 4.9: The match between the competences identified in L1's BEI and learning journal

BEI	Learning Journal
Level 1	
Responsiveness to Change	√
Results Orientation ***	√
Teamwork **	√
Commitment to Learning***	√
Integrity	X
Level 2	
Teamwork **	√
Commitment to Learning***	√
Interpersonal Communication	√
Integrity	√
Results Orientation***	√
Drive for Excellence**	√
Responsiveness to Change	X
Level 3	
Results Orientation***	√
Commitment to Learning***	√
Drive for Excellence**	√

Note: *** Represents the competences identified at three proficiency levels in both instruments, ** Represents the competence identified at level 2 and level 3 in both tools, ** Represents the competence identified at level 1 and level 2 in both instruments

It shall be noted that in both the learning journal and in the BEI, the "commitment to learning" and "results orientation" competences were identified at each one of the three proficiency levels.

ISBN:978-84-693-5423-0/DL:T-1414-2010

It is worth noting that of the 39 behavioral descriptors coded in L1's BEI, 30 of them were coded in her learning journal as well (76.92 %).

The types of behaviors coded in the BEI but not coded in the journal were:

1	acts to avoid an imminent problem	RO	(L1)
2	is ready to receive feedback about her behaviors	INT	(L2)
3	gives or shares merit with whom really deserves it	INT	(L2)
4	sets challenging and achievable objectives	RO	(L2)
5	motivates others to participate in improvement activities	DE	(L2)
6	considers the feelings of others during periods of change	RC	(L2)
7	answers questions with good intentions	INT	(L3)
8	gradually increases the responsibilities of others	RO	(L3)
9	encourages others to identify and share the best practices	CL	(L3)

Note: "RO" = Results Orientation, "INT" = Integrity, "DE" = Drive for Excellence, "RC" = Responsiveness to Change, "CL" = Commitment to Learning, "L1" = Level 1, "L2" = Level 2, "L3" = Level 3

(2) Qualitative Analysis of Critical Events in L1's BEI

This section summarizes the critical events described by the leader in the form of a table (Table 4.10). This table presents:

(a) a narrative description of the critical events described (1st column of Table 4.10)

(b) whether the leader acted upon these incidents (2nd column of Table 4.10)

(c) the number of behaviors coded in each event (3rd column of Table 4.10)

(d) the leader's thoughts, feelings and, the actions against these incidents (4th column of Table 4.10)

(e) the match between the events described in the BEI and the ones explained in the learning journal (5th column of Table 4.10)

During the BEI, the leader recounted 8 critical work events; seven of them were associated with her team members and one of them was related to another team leader.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.10: The critical events explained by L1 during the BEI (incidents are presented in the order explained by the leader)

	Events	Action Taken	# Behaviors Coded	Leader's feelings, thoughts, and actions about the event	Exists in the journal
1	A team member (Steve) who was repeating the first year did not want to do the project because he did not like it, stating that the project was *shit* and the studies were *worthless*.	Yes	10	On hearing this member's comments, L1 felt ***fear*** because her mission was to motivate the members, align them, and make them see the positive aspects of the project. She was certain that having a team member with these types of ideas would not be positive for the team as he might demotivate the others. However, she did believe he ***deserved an opportunity*** so the next day she spoke with Steve. She told him that she respected his opinion and that she understood that he was tired of working hard. She told him that life offered many possibilities and he was not obliged to do the project. She said she was happy to have him in the project but she would make him work at the same level as any other member in her team. She said if he was not willing to do the project, he should tell the coordinators. Finally, Steve decided to stay and became very involved in the project. The leader was surprised because, although Steve did not go to the classes, he complied with the project.	Yes
2	A member (Noe) was from a different culture and believed that the other members did not want to work with her because of her cultural difference.	Yes	21	On hearing Noe's comments, the leader felt ***sorry*** because she understood how Noe was feeling; the feeling of "we have a lot of work to do but the others don't want to get involved as much as me". However, ***the leader knew it was not because of Noe's*** personal difference that the other members did not want to stay and work with her; it was because the members preferred to work alone and they were ***refusing to work in a team***. The leader was ***convinced*** that this was a team problem and not something personal. The leader ***promised*** Noe that she would solve this issue. In the next team meeting, the leader did a force field analysis with the team and asked the members to identify the team's strengths and weaknesses. The members identified the weak points as lack of communication, teamwork, and involvement in the team. The leader said that the team did not change immediately but it improved in the second semester.	Yes
3	During the team meetings, the members showed little initiative and did not say very much. Three members were fairly participative but the other three were not.	Yes	5	The leader found it very ***difficult*** to get the members to participate. Therefore, she asked open questions or questions that she knew that only they could answer (open questions regarding the things that they were working on). As a result, they participated. She ***thought a lot*** about these questions when preparing the meeting. She asked them to tell and propose the things that could be improved or she used question cards which made every member to speak about the topic written on the card. Additionally, ***she talked to the members to make them see*** that they had to participate and this ***enabled them to participate more***.	Yes

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.10 - continued

Events		Action Taken	# Behaviors Coded	Leader's feelings, thoughts, and actions about the event	Exists in the journal
4	On some occasions, Steve laughed during the team meetings when the leader or another member was speaking.	Yes	3	The leader said that Steve's manner (very open and very talkative) was different from the other members who were very shy and quiet. The leader ***stopped*** Steve when he laughed at other members or when he disturbed them or when she thought he might offend them. The leader ***understood*** that if he laughed it was because of his character and she knew that he did not do it with bad intentions. She believed that Steve did not laugh at what they said but at things that came to his mind or at things that he saw.	Yes
5	Steve arrived late several times to the Friday meetings because he had gone out the night before. He explained proudly, in the team meeting, to the other members that he drank too much.	Yes	10	The leader believed this was a ***personal*** subject. She knew that it was habitual for some people to go out and drink too much and see it something enjoyable. However, the leader didn't find it funny to when he explained those things to the team and she found it even less funny when a team member disrupted the functioning of the team with such conversations. Therefore, she had to intervene but she did not how far she could go. He had to understand that she was ***speaking to him because he was affecting the team*** but ***not because she did not like what he was doing in his free time***. She told him: "I can't tell you not to go out on Thursday nights, that is, you are free to go out every night of the week if you wish, but if you have promised to meet with your peers you have to keep your promise to those five people." The leader observed that after this when the members met, Steve arrived at the meeting on time.	Yes
6	The leader told members to prepare the planning report for the 2nd semester as they had done for the previous one. However, the members simply copied the objectives from the memorandum and sent it to the leader.		18	The leader felt ***very angry*** when she received the document but realized that she needed to ***calm down*** and she could not go to the meeting ***angry as this would not achieve anything***. The leader asked them what was the purpose of planning (they said to know when they had to do the things) and she asked them whether this was reflected in their planning. They said "no". She asked them if their planning was good for anything and they responded "no". She asked them what was the difference between the memorandum and their planning and they answered "none". She thought this occasion would ***be a good opportunity to teach them not to depend on her*** (because what they did, the leader explained, was to do the things at the last moment and wait for the leader to correct them). She told them "because of this, I am not going to give you any feedback so you can improve your planning. You must hand it in to the professors as it is". She made it clear from the first day on which points she was going to evaluate their work. Therefore, she evaluated the planning based on the system she explained to the members. Consequently, the grade was 4.65.	Yes

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.10 - continued

Events		Action Taken	# Behaviors Coded	Leader's feelings, thoughts, and actions about the event	Exists in the journal
6	Continuation of the critical event.	Yes		In the following meeting, The leader explained to the members the grade they had obtained in each section of the project. She told them that ***if they disagreed*** with anything they could talk to her about it. She understood that it was a low grade and that if they believed that they did not deserve it, ***she was open to receiving their feedback***. The members said "no" that they deserved this grade.	Yes
7	The team members rated their peers and themselves low on the honesty scale in peer assessment.	Yes	8	The leader was ***very surprised*** to see these results because for her ***it is very important that a person is sincere***. She thought it was a ***problem*** if the members considered themselves not honest. In a team meeting (dedicated to the team related topics) they spoke about this topic. One of the members said "we rated ourselves low because sometimes we don't tell the whole truth, in the sense that, if an activity is half-done, we say we have completed it. Also whenever I have said I could not stay for whatever reason, I was just giving an excuse". The ***leader made them see it was important to be honest*** and that it made no sense to hide the fact that the activity had not been completed from their peers that they would benefit from being honest because their peers could help them. After this, the leader heard on more than one occasion comments such as "we should be sincere and honest, we do need to say it."	Yes
8	Another team leader came to ask her something.	Yes	5	She told the other leader that it was well explained in Ullman's. The other leader said: "no, no I told them not to look in the books. Throughout my studies I never opened a book, and I advise them to do the same." She was surprised and said "What you have to teach first year students is which bibliography they have to look for, not to look for things in Google". She believed it was her task to tell them not how to look for things in Google. Later on, the other leader came to ask if she had the Hsys program. She told him "let's see, yes I have the program, but you have to tell the first year students to look at handbooks such as Perry's but not at programs." The other leader said no because the books were good for nothing, instead they would look for it in Google, and that was that, because it was much quicker, especially since he had told his team members to do things quickly and not waste time looking at books. For her, looking at books was not a waste of time; it might take longer but at least the team members learnt how to do it properly. On another occasion, the same leader told her that around the world all the big companies were making money because they were stealing, and that was what he was teaching. She told him that he was very mistaken, and that the they had to be critical enough to be able to differentiate between what was right and wrong.	

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Of the seven incidents relating to the members, three of them were linked to Steve (event 1, event 4 and event 5), one of them was related to Noe and the team (event 2), and three of them were about the team in general (event 3, event 6, event 7).

The most significant result to emerge from Table 4.10 is that **L1 was a leader in action**. She did not sit around and wait to see what would happen. On the contrary, she took immediate action against all the critical situations that she encountered. She did not see these incidents as problems or obstacles rather she perceived them as a chance for improvement (see event 6 for an example).

Therefore, she had established in her mind **a desired outcome** for each event (e.g. in event 3 she wanted members to see that they lacked teamwork and communication, etc). She carefully thought about how she should act in response to those events so that the desired outcomes could be achieved. It must be noted that L1, in the end, accomplished all that she wanted. For instance, she made Steve comply with the requisites of the project and she made him arrive on time to the meetings. In addition, she got the members to work as a team.

It can be observed in event 1 that **motivating team members** about the project was one of this leader's prime objectives. She had this goal from the beginning of the academic year.

The leader was very *good* **at understanding the underlying feelings and emotions of others** (event 2). This was how she detected that Noe had a problem. She sensed that something was not right when she saw Noe speaking with another member. She waited and approached Noe when she was alone and asked her what was going on. In this way she discovered Noe's conviction that the other members did not want to stay behind to work with her. When she discovered the problem, she advised Noe to be patient and positioned herself as the leader by promising her that she would solve this issue. L1 believed that the problem was a lack of teamwork in the team. She therefore solved the problem as she promised by making team members see that they lacked teamwork.

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Event 3 shows **how much thought the leader dedicated** to solving the members' problem of not being participative in the team meetings.

The leader's responses to the critical events concerning Steve (event 1, 4, and 5), demonstrated that the leader was an **understanding person** rather than a judgmental one. She gave him *the freedom to be like himself*; she did not force him to participate in the project but she explained what was expected of him in the team and let him decide whether or not he wanted to stay. She did not judge his behaviors (e.g. going out at nights and drinking a lot) but rather explained to him how those behaviors affected his peers.

Event 4 demonstrated that the leader had **no tolerance for underperformance**. She directly confronted members when they did not prepare the document as agreed. This event also demonstrates that the leader set and communicated clear work standards and did not shy away from evaluating the work of her team members.

The leader's actions against the last two critical events (event 7 and 8) showed that L1 was a leader with **integrity**. In event 7, she detected that her members did not consider themselves honest. Therefore, she explained to them the importance of being an honest person and encouraged them to act like one. In event 8, she was faced with unethical behavior on the part of another leader, and she immediately confronted him saying that he ought to be able to distinguish between right and wrong.

(3) L1's Responses to Other BEI Questions

This section summarizes L1's responses to the other open questions in the BEI: (1) the past experiences that helped L1 to perform the leadership role, (2) the reasons why she wanted to take on the leadership role, and (3) the typical tasks she carried out during a given week when leading the project team.

Past experiences that helped the leader to carry out her role

According to the leader, working in integrated projects for three years was the most significant past experience that had helped her to act as a leader. In her case, she worked with completely different people each year which meant that she experienced different incidents in the 1st year, 2nd and

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3rd year of her studies. Therefore, the ways in which she had to interrelate with others and to develop teamwork differed greatly from year to year. This general experience gave her a vision regarding the type of people or the type of teams she could work with.

Her reasons for taking on the leadership role

She knew from her 1st year that she wanted to take on the leadership role when she became a 4th year student. She thought that this role would give her a very different view of things. In her 2nd year, she acted as a leader and had no difficulties or problems whatsoever performing this role.

Typical project tasks carried out by the leader in a given week

The typical tasks carried out by L1 are summarized below.

(a) Preparing the meeting agenda: The leader dedicated Sunday afternoons to preparing for the meeting. She sent the meeting agenda on Sundays so that the members could have time to look at it.

(b) Team Meeting: At the beginning of the meeting, the leader let members speak if they had something important to say. Later, she gave feedback on activities. Following that, they spoke about more general topics such as teamwork, communication, or whether they had been achieving their objectives. In the second semester, they dedicated some time to discussing things such as: "how the week passed", "are you better organized than in the 1st semester?". In this part, the members also had to highlight if any of their peers had demonstrated any initiative. At the end of the meeting, they checked their Gantt diagram to see how they were doing with respect to the planning.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

4.1.2.3. 360-DEGREE FEEDBACK

This section presents the results of the 360-degree feedback given to L1. All the team members and the leader participated in the process.

The results are presented in the following order: (1) the comparison of L1's self and member ratings with those of the group of eleven leaders, (2) the degree of congruence between L1's self rating and the ratings given by her team members, measured using the process developed by Atwater and Yammarino (1992).

Figure 4.4a and 4.4b compare the member and self ratings of L1 with those of the other leaders respectively. Member and self ratings are averaged across eight leadership competences to obtain an overall leadership rating. It can be seen that L1 was the **most effective leader in terms of the member ratings** (Figure 4a); she received the highest member rating among the 11 leaders (average member rating for L1= 4.22).

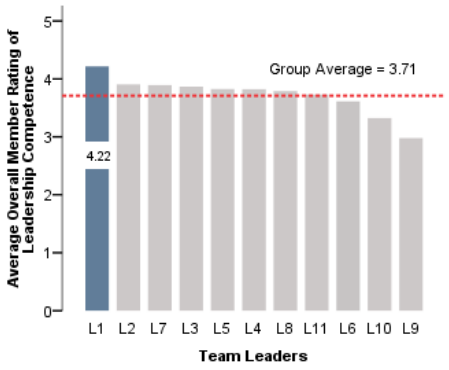

Figure 4.4a: Comparison of L1's average member ratings with the other leaders' average member ratings

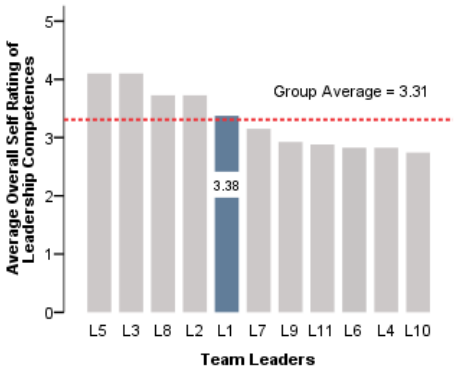

Figure 4.4b: Comparison of L1's average self ratings with the other leaders' self ratings

This leader's self rating (self-rating = 3.38) was in 5th position in the group of leaders (Figure 4b) and it was very close to the average group self-rating (group average = 3.31).

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The congruence between the L1's self and member ratings is presented in Table 4.11. It can be seen that L1's difference score was more than one-half standard deviation below the mean difference. That is to say, **L1 was an under estimator**.

Table 4.11: The congruence between L1's self and member ratings

Mean difference (N=11)	**0.5 SD**	**L1's difference score**	**Agreement Group**
-0.42	0.26	-0.84	Under estimator

Note: Mean difference – 0.5 SD = (-0.42-0.26) = -0.68

This can be observed in Figure 4.5 which compares the L1's self ratings with the ratings provided by her team members for each of the eight competences. It can be seen that the leader's self ratings, in all competences, were below her members' ratings. The reason why the leader underrated her effectiveness may be explained by her preference for Introversion because the introverts tend to have lower self-esteem (Cheng and Furnham, 2003).

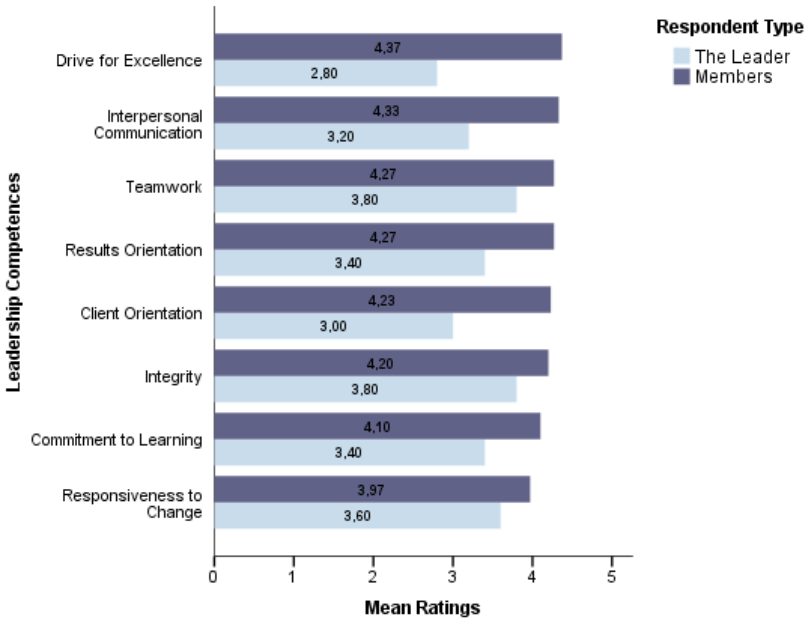

Figure 4.5: L1's self and member ratings for the eight leadership competences evaluated in the 360-degree process

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The leader rated her effectiveness as "acceptable" in all competences but "drive for excellence". In this competence, she rated her effectiveness as "needs improvement" (average self rating = 2.80 < 3.0). Conversely, the team members gave her the highest ratings for "drive for excellence".

The other competences in which the leader received highest ratings were: "interpersonal communication", "teamwork", and "results orientation". For most of the competences, the members rated the leader's effectiveness as "notable". However, for "responsiveness to change" they rated her effectiveness as "acceptable" (member rating = 3.97).

The leader rated her effectiveness highest on the "teamwork" and "integrity". This result is not surprising as the leader's emphasis on team building and integrity has been demonstrated before in the qualitative analysis of her journal entries.

4.1.2.4. FOCUS GROUP

This section presents the results drawn from the analysis of the focus group conducted with the members of L1's team. Table 4.12 displays the date, location, duration, and the participants for the focus group. All of the team members participated in the focus group.

Table 4.12: Focus group date, location, duration and participants (L1)

Date	Location	Duration	Participants
23.04.2008	Classroom 112	32.26 min.	Jonathan Charlotte Noe Jack Drake Steve

Team members were asked to respond target questions regarding their team leader (L1). Table 4.13 depicts the eleven themes that emerged from this focus group.

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Table 4.13: Main themes emerged from focus group with L1's team members

Dimension		Member Responses
1	*Responsibilities and functions of the leader in the team*	According to the members' responses, the leader had four functions in the team: (a) preparing the meeting agenda, (b) setting the objectives, (c) reorganizing the planning, and (d) resolving doubts. The meeting agenda helped members to know the direction of the meeting. The leader set the goal, provided guidance and told them what software could be used. At the beginning, she was responsible for reorganizing the planning. When the members had doubts, ***she did not tell them exactly what they had to do but she gave them the necessary guidelines*** to do the task.
2	*Leader's involvement and help in the project*	All the members said that the leader ***was very involved in the project but without doing the job in question***. The members saw her as an organizer, **a catalyst** that helped them to react. L1 made too many corrections to the activities in the first semester. However, in the second semester she didn't correct as much. The members knew that her reason was that: "they will not have a leader in the following year and they will have to do it by themselves". The members also indicated that it was not the leader's job to correct everything; instead they had to work out for themselves if they had done the activities correctly or not.
3	*Giving feedback*	The members were of the opinion that the feedback provided by the leader was sufficient in the second semester but may be too much in the first semester. They mentioned that L1 ***never gave them direct solutions*** or told them there was an error in the calculation. Instead, she told them what was not coherent. This attitude 1 made the members see and understand why they had done something badly. According to the members, L1 ***was a mediator more than a corrector***. The members acknowledged that L1 never delivered the feedback in an offensive manner and she ***never told them "You did this badly"***, instead she told them "this needs to be revised and looked again". L1 ***always gave them recognition*** for a job well done and for initiative and new ideas. The leader also encouraged them to give recognition to each other for something well done. When the first semester finished, the leader held a meeting with the team to speak about how they could improve as a team and as individuals. In addition, she held individual meetings with members to speak about the areas they could improve in. She held another meeting with members in the second semester to give them feedback on their progress and whether or not they had improved.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.13 - continued

Dimension		Member Responses
4	*The relationships with the leader*	The members were of the opinion that the leader was ***very friendly*** and they felt very comfortable with her. They did not feel like they were speaking to a leader but rather ***with another member of the team***. The members commented that the leader always spoke kindly and ***remained calm***.
5	*Trust in leader*	The members ***had too much trust in their team leader***. They said that she was very meticulous about keeping her promises and when she could not, she apologized and explained the reason why.
6	*Participation in the team meetings*	The members stated that the leader tried to ***get every member to participate in the team meetings***. They added that when the leader saw somebody silent during the meetings, she asked that person his/her opinion to make him/her participate.
7	*Demands high performance*	The members said that the leader was ***too demanding***. They said that the leader gave them the opportunity to improve but that if they did not do it, it was their mistake. They said that it was good that she was demanding but that sometimes they felt overwhelmed with work and when the leader still said no after they had corrected something 4 times they sometimes felt burned out.
8	*Confronts underperformance and does not shy away to evaluate the work of others*	The members said that the leader got angry when the activities were not delivered on time or when they were done in a really bad manner. On these occasions, the members knew that the leader had good reason to be angry. The members, however, emphasized that the ***leader never got angry about mistakes;*** only when an activity was not handed in on time. They never felt bad when she said something had been done badly because ***they knew that she was right***. The members also said that they were penalized too much. One member imitated the leader by saying: "but you only have this activity this semester, and if this activity has a grade of 5, then your mark for algebra is 5".
9	*Conflict Resolution*	The members said that they ***did not have any sort of conflict with the leader*** and that there were ***no big conflicts in the team***; they had a few arguments among themselves due to stress and lack of time but these were not severe conflicts. On these occasions, the *leader attempted to mediate the between the team*. However, if it was something individual she only spoke to the person concerned.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.13 - continued

Dimension		Member Responses	
10	*Inspiring, Motivating, Mobilizing*	Inspiring	The members explained that, especially during the first semester, the leader wanted them to ***realize the importance of the project*** and that she had harped on about this topic. The members said that ***she continued to highlight the importance of teamwork*** in the second semester. She asked them questions such as: "*Well, now that we have established the team norms…..how is the teamwork going?…..how is this?...how is that?…..have you improved as a team*?"
		Motivating	The team members reported that the leader has succeeded in ***maintaining their motivation toward the project in every team meeting***. The members believed that the leader was optimistic and always told them "***I know you can do a good project***". When they had something done badly the leader told them: "I don't doubt that you have done it well, but you can do it better." The members found the leader was ***very realistic*** as she made them see when things were not done well. The leader appeared to be very concerned with the grades that the members got and they knew that if got a low grade, the leader would feel sad. The members mentioned that seeing their leader's hard work and motivation kept them going.
11	*Do the members want to work with the same leader again*	Having got to know her qualities and attitudes all the members expressed their willingness to work with this leader in the future.	

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The first theme was associated with the **leader's responsibilities in the team**. According to the members' responses, the leader had four main functions in the team: preparing the meeting agenda, setting the objectives, reorganizing the planning, and resolving members' doubts. The meeting agenda enabled members to follow the direction of the meeting and L1 also prepared an additional document to remind the members of the tasks they had to do.

The second theme was linked to the **team leader's involvement in the project**. Though the leader got highly involved in the project, at no time did she take part in doing the job itself. In the first semester, the leader intensively corrected the activities whereas in the second semester she gave the members a certain degree of freedom to enable them to stand on their feet in their future studies. From the members' responses it became apparent that the leader clearly transmitted her function in the team; the members were conscious that it was not L1's responsibility to continuously correct the things in their project work.

The third theme was related to the **feedback provided by the leader**. The leader's feedback on the activities enabled members to see their mistakes. By no means had she given them the direct answers. The manner in which the feedback was delivered was pleasing for the team members. In addition, the leader provided the members with recognition for initiative and a job well done and. In addition, she also encouraged her members to give positive feedback to each. Apart from giving feedback on activities, the leader provided feedback for their personal development as well. For this purpose, she met with the members individually and identified the areas in which they could improve. In another individual meeting (coaching session), she provided feedback on their progress, discussing those areas where they have improved or where they need to develop more.

The fourth theme was associated with the **members' relationship with the leader**. The members perceived their leader like another member of the team; not like a boss. They found her very friendly and felt quite comfortable with her.

The fifth theme was about the **members' trust in the leader** and they trusted in L1.

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The sixth theme was about **participation** and the members explained that the leader got everybody to participate in the team meetings.

The seventh theme was related to the **high demands placed by the leader**. The team members perceived her as a highly demanding leader. This sometimes made the members feel overwhelmed by the work.

The eighth theme was about **leader's confrontation of underperformance**. The members mentioned that they were penalized when they did not hand in tasks on time. However, they never felt bad when they were told that something was not done well because they knew that the leader was right about that.

The ninth theme was related to **the conflicts in the team**. In fact, the members said that there had been no conflicts either with the leader or within the team. When they did have small arguments, however, the leader mediated.

The tenth theme demonstrated that L1 was a very **inspirational and motivating leader**. She inspired her members regarding the importance of the project and teamwork. Her realistic and optimistic attitude was a source of motivation for her team members. In addition, by being a highly motivated hardworking person, she motivated her members to act the same as well.

On considering the qualities and the characteristics of their team leader, all the members of the team claimed that **they would like to have her as a leader again in the future**.

4.1.2.5. TEAM CLIMATE

This section presents the quantitative and qualitative analysis of the team climate data for L1's team. The quantitative data presents the average member and leader ratings for the 22-item team climate survey. The qualitative results collect respondents' answers to the two open questions of "*what did you like most and what did you like least about the project*".

Table 4.14 summarizes the survey administration date and the number of members who answered the survey for each semester.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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Table 4.14: Team climate survey for L1; administration dates and number of respondents

Semester	Administration Date	Respondents
First Semester	11.12.2007	All six team members and the team leader
Second Semester	12.05.2008	All six team members and the team leader

The results are shown in Figure 4.6. It can be seen that in both academic semesters L1's climate ratings were somewhat higher than those of her members. When compared with the other teams, the member ratings of this team in each academic semester were close to the average climate rating. However, L1's ratings were above the average leader rating.

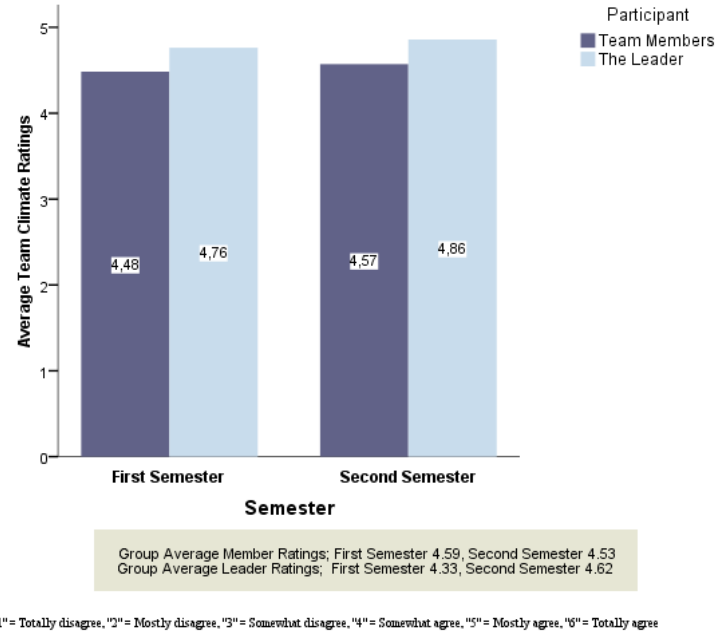

Figure 4.6: Team climate survey results for L1's team according to respondent type and the academic semester in which the survey was administered (ratings are averaged across 22-survey items).

As shown in Figure 4.6, this team's climate ratings (both member and leader) slightly increased in the second semester. That was because the

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ISBN:978-84-693-5423-0/DL:T-1414-2010

members and the leader increased their ratings on several survey statements in the second semester. These statements are presented in Table 4.15.

Table 4.15: The survey statements with increased ratings in the second semester (dark blue highlights an increase in members' ratings and light blue represents an increase in leader's ratings to the survey statements)

		Team Members		Team Leader	
		1st semester	2nd semester	1st semester	2nd semester
11	The team demonstrated a creative attitude and experimented with new ideas.	3.83	5.00	5	5
6	The team working methods are effective.	3.50	4.50	4	4
12	The project planning has helped us to accomplish project objectives.	4.67	5.50	6	6
10	In the team we say things in a direct, honest, and respectful way.	3.50	4.50	5	4
3	The level of communication in the team is adequate to carry-out the project activities.	4.17	4.33	3	5
14	The team regularly evaluates the effectiveness of the methods.	4.67	5.00	2	5
15	I fully trust my team leader.	**6**	**6**		

Response scale: "1" = Totally disagree, "2" = Mostly disagree, "3" = Somewhat disagree, "4" = Somewhat agree, "5" = Mostly agree, "6" = Totally agree

The members increased their ratings for four survey statements (statements: 11, 6, 12, and 10). In the second semester, the members "mostly agreed" with survey **statement 11** that their *team demonstrated a creative attitude and experimented with new ideas*.

During the first semester, the members "somewhat disagreed" with survey **statement 6** (*the team's working methods are effective*), whereas in the second semester they "somewhat agreed" with this statement.

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The members, in the second semester, "mostly agreed" with the survey **statement 12** that the *project planning had helped them to achieve project objectives*.

For survey **statement 10**, the member ratings changed from "somewhat disagree" to "somewhat agree" indicating that in the second semester the members somewhat agreed that as a team *they said things in a direct, honest, and respectful way*.

The leader, on the other hand, gave higher ratings for statements 3 and 14 in the second semester. She mostly agreed with **statement 3** that the *communication in the team was adequate* and that *the team regularly evaluated the effectiveness of the methods*.

The members' responses to statement 15 revealed a very important aspect of this leader; **she was a trusted leader**. All of the six team members in both academic semesters totally agreed that they fully trusted in L1.

Table 4.16 collects the verbatim comments of the participants regarding the open survey questions: "what did you like most about the project?" and "what did you like least about the project?"

What the **members' liked most** about the project was the teamwork in itself (improving the coordination of the team, having better relationships with other members of the team, etc.) and learning to organize themselves, act on initiative, and carry out a project. Interestingly, one member claimed that L1 was a "star".

What the **members did not like** was the lack of involvement from other members in the first semester. Also, in the second semester they claimed that they could not study other subjects because the project required a lot of time.

The thing **the leader liked most** was to be able to apply the techniques that were thought up in the PMP course. What **she liked least** was the lack of coordination between 1st and 4th year.

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Table 4.16: Verbatim comments from L1 and his team members regarding what they liked most and least about the integrated design project

Semester	Participant	Positive Comments	Negative Comments
First Semester	*Members*	When we work really hard, we finish the activities quickly and well.	A lot of people are not dedicated to their work including myself.
			A lot of members need to get more involved in the project.
		The improvement in the coordination of the team.	The project requires a lot of hours.
		Seems like the project is going well.	The occasional lack of involvement
		The leader is a star.	A member of the team.
		Teamwork.	
	Leader	To experiment with the techniques taught in the class with the project team.	The lack of coordination between 1st and 4th year.
Second Semester	*Members*	Having had friendships with the members of the team.	The behavior of some members of the team.
		Teamwork.	
		Learning to get organized and to have initiative.	The project takes a lot of hours away from other studies.
		Doing this project I have learned a lot about how to do a job.	Requires a lot of class hours, part of which I need to study the other subjects.
		To learn to have more initiative.	Losing hours.
		Has helped me a lot to study some courses.	A lot of hours.

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4.2. CASE STUDY 2

L6's leadership picture

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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4.2.1. INTRODUCTION

This case study aims to provide a detailed analysis of leader 6 (L6)'s leadership; that is the leadership behaviors (both effective and ineffective) exercised by this leader throughout the whole academic year.

Five research tools have been used for this purpose: (1) learning journal, (2) the behavioral event interview, (3) 360 degree feedback ratings, (4) the focus group, and (5) the team climate survey.

Before the results section, the following two subsections present the personality profile of L6 and the characteristics of his team respectively.

L6's Personality Profile

L6's personal profile has been identified using four instruments: (1) Belbin's Self Perception Inventory (BSPI), (2) the Managerial Style Questionnaire, (3) the Myers-Brigs Type Indicator (MBTI), and (4) the Schwartz Value Survey. The results are presented in Table 4.17.

Table 4.17: L6's personality profile

Team Role (Belbin)		**Managerial Style**		**MBTI**	**Values (Schwartz)**	
Primary	Secondary	Primary	Secondary		Primary	Secondary
IMP	TW	AFF	COA	ISTJ	HE	CON

Note: "IMP" = Implementer, "TW" = Teamworker, "AFF" = Affiliative, "COA" = Coaching, "HE" = Hedonism, "CON" = Conformity

The primary and secondary **team role preferences** of L6 were "implementer" and "teamworker" respectively; meaning that L6 did not have a preference for a leader role in a team setting (i.e. shaper or coordinator). The "implementer" is disciplined, reliable, and conservative and can be slow to respond to the opportunities. The "teamworker" is cooperative and averts friction but can be indecisive and might be influenced easily (Belbin, 1981-1993).

The primary and secondary **managerial styles** of L6 were "affiliative" and "coaching" respectively. The "affiliative" leader places more emphasis on

the individuals rather than the task in hand and tries to create harmony and avoid conflict. This style tends to avoid performance related confrontations. The "coaching" leader helps the employees to establish a development plan, and provide ongoing support and feedback.

The **MBTI type** of L6 was "ISTJ". ISTJs are typically seen as calm and reserved and are likely to be uncomfortable expressing affection and emotion to the others. However, their strong sense of duty usually allows them to overcome their natural reservations. They are very loyal and faithful; they place great importance on honesty and integrity.

The **high-priority** values of L6 were "hedonism" and "conformity". People who put high priority on "hedonism" enjoy pleasure and sensuous gratification. People who value "conformity" restrain themselves from any actions, inclinations, and impulses that are likely to upset or harm others and violate social expectations or norms.

The Team of L6

L6's team was composed of 6 full-time first-year Ch.E. students (Table 4.18). Of these members, one (David) was repeating the first year.

Table 4.18: The characteristics of the team members led by Leader 6

Team Members		Situation	Belbin Roles		Team Balance	Missing Team Role
			Primary Role	Secondary Role		
M1	Marc	F.S.	TW	ME	Balanced	-
M2	Joseph	F.S.	PL	ME-CF		
M3	Javier	F.S.	IMP	PL		
M4	Emma	F.S.	SH	CO		
M5	Jordi	F.S.	IMP-CO	TW		
M6	David	F.S.-Repeating	CO	RI		

Note: "F.S." = Full time student, "TW" = Teamworker, "ME" = Monitor evaluator, "PL" = Plant, "CF" = Completer finisher, "IMP" = Implementer, "SH" = Shaper, "CO" = Coordinator, "RI" = Resource investigator

The team can be considered *balanced* as all eight team roles were represented in the profiles of the members as primary or secondary team roles.

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4.2.2. DATA ANALYSIS & RESULTS

This section presents the analysis of data gathered from L6's learning journal, behavioral event interview, 360 degree feedback, focus group, and team climate.

4.2.2.1. LEARNING JOURNALS

The analysis of the learning journal seeks to identify:

(1) L6's journal entries,

(2) The leadership behaviors coded in his journal, and

(3) The characteristics of the team and the leader as identified by the leader's narrative explanations in the journal.

(1) Entries in the Journal

This section examines in brief L6's journal entries throughout the academic year. His journal was 11 pages in length and he made a total of 20 journal entries. The first entry was made on October 23rd, 2007 and the last entry was made on May 5th, 2008.

The regularity and the frequency of L6's learning journal entries are displayed in Figure 4.7 which plots the number of entries made by L6 against the weeks of journal writing activity.

It can be seen that L6's journal entries were very regular in the first academic semester (between week 2 and week 9). However, in the second semester, the journal entries became irregular; he missed 6 out of the 15 weeks of journal writing activity in the second semester.

UNIVERSITAT ROVIRA I VIRGILI
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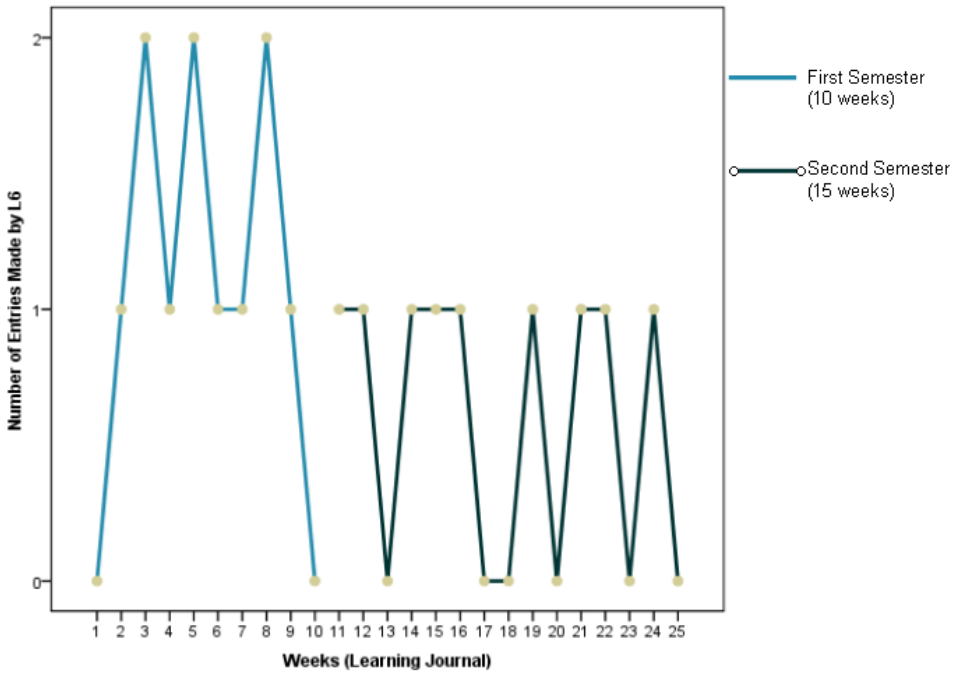

Figure 4.7: Number journal entries made by L6 throughout the period of journal writing activity

It can be also observed that L6's entries were more frequent in the first semester. He made two journal entries at weeks 3, 5, and 8. However, in the second semester he made only one entry per week during the weeks he was writing in his journal.

(2) Leadership Behaviors in L6's Learning Journal

This section has two main objectives:

(a) To identify the proficiency levels of the leadership behaviors coded in L6's learning journal and to compare these with those of the group of eleven leaders (Figure 4.8).

(b) To show the corresponding competences for these coded behaviors at each proficiency level (Table 4.19).

A total of 97 leadership behaviors were coded in the L6's learning journal (Figure 4.8). Of these behaviors:

17 were at level 1 (leadership without title),

76 were at level 2 (team leadership),

4 were at level 3 (organizational leadership).

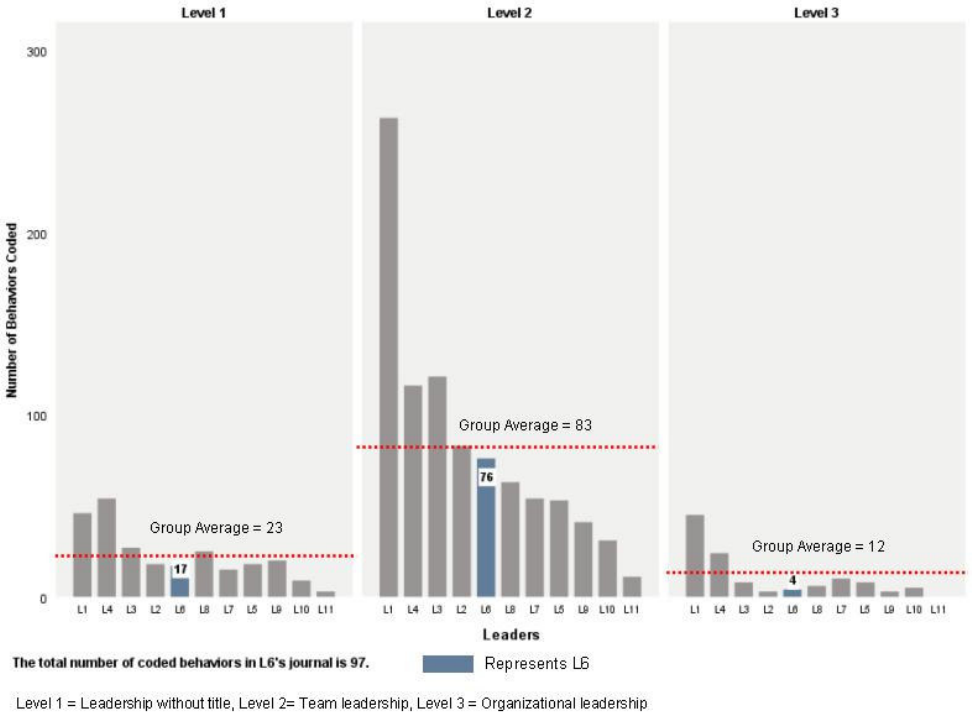

Figure 4.8: Frequency distribution of the 97 behaviors coded in L6's journal across three proficiency levels and how this compares with the group of eleven leaders

It can be seen that the majority of the coded behaviors in L6's journal were **at level 2** (team leadership).

It can also be observed that the number of behaviors coded in L6's journal were **below the group average** in all proficiency levels. As far as the behaviors at team leadership level are concerned, L6 had the fifth-highest number of coded behaviors.

The corresponding competences for the leadership behaviors coded in L6's journal are displayed in Table 4.19.

Table 4.19: The frequency distribution of the coded 97 behaviors in L6's learning journal across proficiency levels, competences, descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Is willing and open to receive feedback.	6
			2	Puts into practice everything that learns.	2
			3	Wants to do the things well.	1
			4	Sees set-backs and errors as a chance to improve.	1
		Total			**10**
	Teamwork		5	Has confidence in team members.	5
		Total			**5**
	Integrity		6	Expresses openly what he thinks.	1
			7	Assumes responsibility for his/her actions, does not blame others.	1
		Total			**2**
	Total in level 1				**17**
Level 2	Commitment to Learning		1	Provides a balanced view of members' strengths and weaknesses.	17
			2	Is committed to enlisting support for members.	3
			3	Calms others in new learning situations.	1
		Total			**21**
	Teamwork		4	Demonstrates caring leadership.	15
			5	Ensures that the others have clear objectives, expectations and responsibilities.	3
			6	Assesses and selects appropriate leadership approach.	1
			7	Gives recognition to the contribution of others.	1
		Total			**20**
	Results Orientation		8	Manages performance.	9
			9	Confronts people with performance problems.	3
			10	Readily adjusts plans to achieve objectives.	1
			11	Provides constructive timely feedback.	1
		Total			**14**
	Interpersonal Communication		12	Understands others' underlying problems, motivations and needs.	8
			13	Demonstrates tact and diplomacy.	2
		Total			**10**
	Drive for Excellence		14	Demonstrates a positive attitude to doing things.	8
		Total			**8**
	Integrity		15	Immediately confronts inappropriate behavior.	2
			16	Openly admits mistakes and errors.	1
		Total			**3**
	Total in Level 2				**76**
Level 3	Interpersonal Communication		1	Is accessible to the others.	2
			2	Speaks with conviction and in an inspirational manner about the objectives and the importance of daily work.	1
		Total			**3**
	Commitment to Learning		3	Look and proposes adequate challenges for personal development.	1
		Total			**1**
	Total in Level 3				**4**

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Three competences were identified at level 1, six competences at level 2 and two competences at level 3. The occurrences of these competences across three proficiency levels are summarized below. "Commitment to learning" competence was identified at all three proficiency levels.

Competence	**The Levels Coded at**
Commitment to Learning	Level 1 - Level 2 - Level 3
Teamwork	Level 1 - Level 2
Integrity	Level 1 - Level 2
Interpersonal Communication	Level 2 - Level 3
Results Orientation	Level 2
Drive for Excellence	Level 2

It can be observed from Table 4.19 that the leader demonstrated a **narrow range of** leadership behaviors and competences at each of the three proficiency levels.

The number of behavioral descriptors coded in L6's learning journal is summarized below at different proficiency levels. A total of 26 different behavioral descriptors were coded in L6's journal.

Levels	**Number of Behavioral Descriptors**
Level 1	7 descriptors
Level 2	16 descriptors
Level 3	3 descriptors
In Total	26 behavioral descriptors

However, some of these behavioral descriptors were codified more frequently than the others in a given competence. For instance, the total number of behaviors coded in the "commitment to learning" competence at level 2, was 21. However, 17 of these were the behavioral descriptor of "provides a balanced view of team members". The other two descriptors (calms others in new learning situations and is committed to enlisting support for others) were coded one and three times respectively. As such, there were several other behavioral descriptors coded with high frequency which are summarized in the following page.

UNIVERSITAT ROVIRA I VIRGILI
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1	Is willing and open to receive feedback	CL	L1
2	Demonstrates confidence in members	TW	L1
3	Provides a balanced view of members	CL	L2
4	Provides support for members	CL	L2
5	Demonstrates caring leadership	TW	L2
6	Manages performance	RO	L2
7	Confronts performance problems	RO	L2
8	Understands others' underlying problems, motivations	IC	L2
9	Demonstrates a positive attitude to be able to do the things	DE	L2

Note: "CL" = Commitment to Learning, "TW" = Teamwork, "RO" = Results Orientation, "IC" = Interpersonal Communication, "DE" = Drive for Excellence, "L1" = Level 1, "L2" = Level 2

The qualitative data regarding the occurrence of these behaviors are presented in Table 4.20. It can be seen from this table that the leader was focused on:

- one type of feedback (feedback from the monitoring team),
- the strengths and weaknesses of mainly one member's (Joseph),
- providing support on few aspects of the project (e.g. format of the reports),
- the problems of only one member (Javier),
- managing only one aspect of the project (format).

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.20: The behavioral descriptors coded with high frequency in L6's leaning journal and the qualitative descriptions for these behaviors

Behavior	Qualitative data
Is willing and open to receive feedback. L1-CL	The leader's comments regarding the feedback, in all the cases, related to those provided by the ***monitoring team*** (meeting observation and team climate). He did not, however, mention other feedback processes such as 360 degree feedback or feedback from the coach.
Demonstrates confidence in members. L1-TW	The leader mentioned in his journal that he had trust in his members' abilities to do the things. He ***did not*** however mention in his journal whether he had also ***verbally*** communicated this to his members.
Provides a balanced view of members' strengths and weaknesses. L2-CL	It shall be noted that the occurrence of this behavior was mostly related to ***one specific member***; Joseph. Of the 17 behaviors coded, 8 of them was related to Joseph (2 of them with Marc), 3 of them was related to David (one with Ema), 1 of them was related to Jordi, and 4 of them was related to the team in general.
Provides support for members L2-CL	Two of the three times that this behavior was coded he was providing help to a member who did not know how to use ***excel***. The other one time that this behavior coded was related to giving support regarding the ***format*** of the reports.
Demonstrates caring leadership L2-TW	Many of the behaviors coded here were related to ***demonstrating interest*** in the ***members' problems*** and ***personally investigating*** these problems. Each time this behavior was coded, the leader was investigating the problem of one particular member; Javier who was missing team meetings and lacking motivation. Many of the other behaviors coded here were related to *demonstrating preoccupation* for members' motivation.
Manages performance L2-RO	The leader's managing of performance was related to examining whether the tasks were done according to the standards stated in the ***stylebook***. Therefore, he was checking the format of the reports.
Confronts performance problems L2-RO	The three times that the leader confronted team members were all related to ***problems in the format of the reports***.
Understands others' underlying problems, motivations. L2-IC	This leader is good at understanding others' problems, motivations, and problems.
Demonstrates a positive attitude to doing things L2-DE	In his entries the leader sounded very ***positive*** about all the challenges he faced. However, he does not show in his journal that he demonstrated or transmitted this positive attitude in front of the team as well.

Note: "L1" =Level 1, "L2" = Level 2, "L3" = Level 3, "CL" = Commitment to Learning, "TW" = Teamwork, "RO" = Results Orientation, "IC" = Interpersonal Communication, "DE" = Drive for Excellence

UNIVERSITAT ROVIRA I VIRGILI
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(3) The Qualitative Data about the Team and the Leader

This section has two main objectives. The first one is to determine L6's perception regarding his team and the functioning of its members. The second one is to elaborate on L6's leadership behaviors (both effective and ineffective). For both purposes, qualitative data in the form of written narratives are used and relevant journal excerpts are duly presented.

L6's Perceptions about His Team Members

L6's perceptions about his team and the functioning of its members are collected in Table 4.21. According to L6, he had very enthusiastic team members; eager to learn to and eager to do the project. The leader, most of the time, was positively surprised by the way the team members were working. Examples of this included: delivery of tasks before the scheduled date with an acceptable level of quality, innovative ideas for carrying out the tasks, doing more than was required, etc. The way the team functioned undoubtedly made the team leader feel satisfied and happy.

However, L6 observed that the performance of all team members was not the same. At one end of the spectrum there were two members **Joseph and Marc**, who stood out over time (especially in the second semester). These two members did high quality work and completing the tasks in good time. The leader commented that **with these two members things were easier**. Among these two, Joseph became the "star" of the team with his ability to contribute new ideas to the team (his role was PL).

At the other end of the spectrum there was **Javier**; the member who *was unmotivated* by the project. In addition to that, he did not attend team meetings regularly, especially in the second semester and he did not go to the exams either. The leader nicknamed him as "the member that does nothing".

UNIVERSITAT ROVIRA I VIRGILI
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Sibel Özgen
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Table 4.21: L6's perceptions of his team members

Person	Qualitative Data	Week
The Team	I can see that the members really want to learn and to do the job. This really gives me a sense of satisfaction …..	2
	They are first-years but they don't waste time; they have already presented force balances and specification sheets.	3
	The members are completing the tasks at a good rate.	4
	Once again the tasks have been delivered in the way that they have been asked to.	6
	Today was Tuesday so we held the meeting. Once again the things looked fine. The only things left to do are to prepare the energy balance, prepare some reports and clarify the algebra	8
	(Regarding the first meeting of the second semester). The rest of the team members came with a lot of enthusiasm.	11
	The members are continuing in their usual manner; that is to say positively.	12
Joseph and Marc	For example, Joseph had done the PFD in 3D (he is a star) and with flash rather than Auto-cad or something else.	8
	Joseph is always the one with least desires to go back to do the project again…….	11
	Marc and Joseph did almost all calculus and I don't think they have too much things to do about numerical methods. These two really want to do things and they have potential.	14
	Once again Joseph and Marc are outperforming the others….. These two are functioning very well which really pleases me. With them the things are much easier academically. The others are not working badly but they are working at a slower rate "without stopping but without hurrying".	15
	Because of the exams the members were not able to devote as much time to the project. Only Marc and Joseph have advanced in calculus.	16
	Marc and Joseph have finished the calculus task in more than a satisfactory manner.	19
Javier	The most frustrating member is Javier…….He told me that he thought that it (the project) was too much work for what you learn from it and said that he would have preferred not to do it.	2
	Javier, the member that does nothing, has delivered the task and to quite an acceptable level. This is an important result.	7
	Javier was missing from the team meeting.	11
	Javier continues to be absent.	15
	Javier did not come today.	16
	I heard that Javier had not gone to any exams. Even if he had gone, he obtained a grade of zero.	19
David, Emma, and Jordi	The thing which thrilled me is David's enthusiasm; in addition to showing enthusiasm for the project he also guides the rest of the members.	2
	I was amazed by David when he told me that he had finished his part and that he would start on the statistics immediately. Of course, I was really happy.	7
	David told me that statistics and calculus were all done. I knew from the emails during the weekend that the statistics was in the correction stage but the calculus…. I admit that this really made me happy. Now, there is nothing left but the energy-balance.	8
	David and Emma are doing the QF. They are doing more hours per week but still bring very little to the project.	15
	I think that I have over valued David. I gave him some tasks to complete thinking that he would know how to do them as he was repeating the year but he has failed to them.	19
	Jordi, just like, Joseph feels burned out by the project.	21
Final Comment of the Leader	There have been two clear tendencies. In the first place, Javier, Joseph, Emma and Jordi have made a real effort to arrange things and really it is because of them that the project had been delivered in the way it has. On the other hand, Javier and David hardly seemed to be present.	22

ISBN:978-84-693-5423-0/DL:T-1414-2010

In between these two extremes there were the other three team members: **David, Emma and Jordi**. Of these three members, the leader's comments were mostly related to **David**. The leader was positively surprised by this member's willingness and enthusiasm to do the project and he was amazed by David's work in the first semester. However, in the second semester, the leader commented that David's contribution to the project was not of vital importance. The other two members, **Emma and Jordi**, appeared very few times in the journal and it was not possible to identify their contribution to the team's functioning. All we could tell about these two members was that they were burned out by the project.

The leader's final comment summarizes how the project was carried out by the members of the team. It became clear that *the project work was accomplished by mainly four team members* (Joseph, Marc, Jordi, and Emma) whereas the other two members (David and Javier) hardly contributed.

Characteristics Leadership Behaviors of L6

This section aims to provide the characteristic leadership behaviors of L6 as determined by the qualitative data (journal excerpts) from his learning journal. Table 4.22 groups L6's characteristics under two main groups. The 1st group collects the characteristics of L1 that can be considered as indicators of **ineffective leadership**. The 2nd group collects the characteristics that can be considered as **positive characteristics** of a leader. The possible links between these characteristics and the leader's personality preferences are presented wherever possible.

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Sibel Özgen
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Table 4.22: Characteristics of L6 as determined by the journal excerpts from his learning journal

INEFFECTIVE LEADERSHIP	POSITIVE CHARACTERISTICS
• Feels insecure in the leadership role • Is indecisive • Has difficulties in expressing his feelings in detail (difficulty keeping the learning journal) • Has difficulties managing meetings • Has difficulty in providing recognition and encouragement • Does not feel valued by the team • Enjoys informal contact with members but does not initiate it • Identifies problems but does not act Does not act to solve a future problem or take opportunities, waits Does not act to solve conflicts with a team member Does not take charge of solving team members' problems; does not provide support or practical guidance Does not take charge of accelerating the project schedule Does not motivate people to endure challenges and work through tough times Does not seem concerned about finishing things at the very last moment Does not seem to be particularly concerned about last-minute mistakes and corrections Expects certain behavior but does not set a personal example	• Is self aware • Is kind • Has a sense of humor (can laugh at himself)

UNIVERSITAT ROVIRA I VIRGILI
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1-INEFFECTIVE LEADERSHIP

Feels insecure in the leadership role

The two journal excerpts below demonstrate that, at the beginning of the year, the leader was feeling uncomfortable and insecure in the leadership role. In addition, he was having self-doubts about his effectiveness as a leader. The reason for his uncomfortable feelings in the leadership role, as the leader also mentioned, could be explained by his non-leader role preferences ("implementer" and "teamworker").

> *The truth is that I feel a* ***little bit strange.*** *It must be because I am still not used to dictating tasks to the others. I think that it is because of my character (Belbin roles implementer and teamworker). Anyhow the willingness to do a good project I think makes up for my* ***insecurity****.*
>
> 1st journal entry

> *I am a little bit worried.* ***I have doubts about myself. I wonder*** *if I am really doing it well; being the leader, especially the manager part of it.*
>
> Journal entry from the 2nd week

Is indecisive

The two illustrative quotes provided below demonstrate that for the leader it was difficult to make decisions; he was indecisive. More than that, he was comfortable in accepting the decisions of others (can be easily convinced).

> *On one hand, I feel sad about pushing people too much because I would not like them to lose their motivation after some weeks. On the other hand, I have the sensation that a lot can be done but what if in the end we would not have sufficient time to do all of them.* ***Eternal indecision.***
>
> Journal entry from the 1st week

UNIVERSITAT ROVIRA I VIRGILI
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1-INEFECTIVE LEADERSHIP

> *I have always been **indecisive**. It is very difficult for me to choose something in particular. Moreover, I don't mind accepting the decisions of others.*
>
> Journal entry from the 6th week

His indecisiveness and his tendency to be persuaded can be explained by his team role preference; "teamworker". That is because one weakness of a "teamworker" is that they are often indecisive in crunch situations and they can be easily influenced by others (Belbin, 1981; p.22).

Has difficulties in expressing his feelings in detail *(difficulty in keeping the learning journal)*

It was observed from the entries to the journal that L6 had a natural tendency to *not* explain the situations and the feelings in detail and to do so was difficult for him (see the two excerpts below).

> *It is possible that I might not maintain the quantity of the text written today as I am a person who finishes explaining everything in four lines.*
>
> Journal entry from the 1st week

> *I will try to explain what happened last week though I foresee that it would be difficult, knowing **my natural tendency to not explain** many things about my feelings.*
>
> Journal entry from the 7th week

The difficulty he encounters when it comes down to explaining his emotions can be explained by his "ISTJ" personality type; ISTJs are likely to be uncomfortable in expressing emotions to others.

It has been demonstrated that L6 made regular entries to his journal through-out the first academic semester even when he thought that he might not be able to do that.

ISBN:978-84-693-5423-0/DL:T-1414-2010

In the second semester, his journal entries became irregular and this can be best explained by the leader's own words;

> *After perhaps three weeks without touching to the journal, I have gone back to it. This is what happens. You enjoy it a lot when you start writing and you do it meticulously. One day, suddenly you forget to do it and then you don't remember again for a while.*
>
> Journal entry from the 19th week

> *I do not think that the journal has helped me too much. Despite having tried to be consistent and to be a little more expressive in my writings, I can say that* ***it is not for me****. I have already commented in some emails and conversations that I have never been very constant and that doing things like this* ***is very difficult*** *for me.*
>
> Last journal entry

The leader's own words explain that journal writing was nice when he started doing it but in the end it was a very demanding and difficult task for him as he needed to be expressive in his writings. Yet, the leader was very aware of his tendency to not to explain his feelings in detail and he was very aware that he had been inconsistent in writing to the journal.

Has difficulties in meeting management

The passage below from the journal evidences that the leader was very uncomfortable with the way he was handling team meetings.

> *Every day I feel* ***more nervous*** *at being the first leader to finish the meeting, I get* ***nervous but very nervous****. It gives me a disturbing and a very unpleasant sensation that I left something untold. Here comes the problem, I don't leave ANYTHING!!!! Let's see if the visits of the monitoring team can help me.*
>
> Journal entry from the 5th week

ISBN:978-84-693-5423-0/DL:T-1414-2010

His concerns regarding meeting management continued in his following journal entries. In the sixth week, he mentioned that he had again finished the meeting at 12.30 (half an hour earlier than the time allotted for the meeting; meetings should finish at 13.00). In week 11, he decided to manage the meetings according to the criteria provided by the monitoring team. However, in week 14 he commented that he had not improved very much in his areas of development (i.e. to stay on track and to ask insightful questions). Two weeks later (week 16) he wrote the following;

> *The aspects that I needed to improve were to stay on track and to ask insightful questions. I sincerely think that* ***I have not improved very much****. In my opinion, things have gotten worse compared to the last meeting; this time it was a* ***bit chaotic****. In general, the evaluations (of the monitoring team) were above the minimum requirement.*
>
> Journal entry from the 16th week

These journal entries clearly demonstrated that the leader had difficulties in managing team meetings and this situation explains why the leader mentioned the feedback from monitoring team (See first row of Table 4.20).

Has difficulty in providing recognition and encouragement

In the qualitative analysis of the leader's perception about the team it has been mentioned that the leader, most of the times, was happy with the team's functioning (see Table 4.21). However, the leader mentioned *only one time* in his journal that he had provided a hard working member with positive feedback and encouragement.

This incident is provided in the following page. It can be observed that giving positive feedback was not natural (skill) for him. The only one time he gave a positive feedback, he made it as a small comment.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

1-INEFFECTIVE LEADERSHIP

> *Another thing that shocked me was David….My surprise was when David told me that he had already finished everything from his part and now he would start to work on statistics immediately and I, of course, super happy by the interest he showed … The big thing happened when I was giving the deadlines. I set the deadline to be the following meeting and he told me no; he would have everything done by Friday …* ***I could not help making a little comment*** *about his interest saying that and it was great that he had this interest.*
>
> Journal entry from the 7th week

Does not feel valued by the team

It has been mentioned before that L6 perceived his team as being hard working one and possessing initiative. The leader's following sentence demonstrates, however, that he might not have felt valued by this highly autonomous team.

> *For some days the members have been coming to ask me things about both the project and about their other subjects. This really comforts me because I feel a* ***little more valued in a team that is so independent****.*
>
> Journal entry from the 15th week

Enjoys informal contact with members but does not initiate it

The sentence below shows that the leader was pleased to have informal contacts with the team members and to have an informal talk with them. However, in no part of the journal he demonstrated that he had initiated that type of interaction with the team members. It was the members who approached him.

> *I liked very much the confidence that the members had in me when speaking about the things outside the project. Things that did not reach to personal things but things like what they did on Thursday, etc. A conversation without tensions, informal conversation.*
>
> Journal entry from the 7th week

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1-INEFFECTIVE LEADERSHIP

Identifies the problem but does not act

This subsection encompasses **eight types of events** against which the leader did not take any action.

1-Does not act to solve future problems or take opportunities waits

This part presents three incidents related to L6's inaction when faced with future problems (incidents 1 and 2) or opportunities (third incident).

In the first incident, the leader identified that he might need to gather some information about his team members to prepare the close-out report before he left for the Christmas holiday. In fact, he did not know exactly what kind of information was needed. Though it was important for him to obtain this information as soon as possible, he did not take action to ask to course professors personally what was needed. Instead, he was waiting for the course professors to explain it in class.

> *Regarding the PMP, **it is the time that somebody explains** what should be done for the close-out report. Depending on what it is required, some information regarding the members might be needed. Apart from that I would like to know as soon as possible to be able to start it immediately because I will have no time in the Christmas time.*
>
> Journal entry from the 7th week

The second incident was related to poster preparations and it happened 10 days prior to the project delivery. The leader was waiting to see if a team member had made the distribution of the poster.

> *Ten days before the end of the project. Let's see **if David has already done the distribution of the poster** and we can dedicate ourselves to the report. For the moment, there is no reason to worry about.*
>
> Journal entry from the 8th week

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1-INEFFECTIVE LEADERSHIP

Identifies the problem but does not act

The third incident was related to the Team Charter. The Team Charters of most leaders' were not structured adequately; hence, a second chance was given to the leaders to improve this document. Despite this, **it took him seven weeks** to deliver the revised Team Charter (see the journal entries below).

> *The second point of concern is the Team Charter. For my part, I think that the first Team Charter of our lives must permit a certain flexibility……..This has left a feeling of "**Shit, another lost weekend**".*
>
> Journal entry from the 2nd week
>
> *Still, I need to finish the Team Charter. Let's see how it turns out.*
>
> From the entry made on the 6th week
>
> *For the moment, I am doing the Team Charter. I am embarrassed about not having it finished. Let's see if I can deliver it soon.*
>
> Journal entry from the 7th week
>
> *Finally, the Team Charter has been delivered. It was the time.*
>
> Journal entry from the 9th week

This last incident can be explained by leader's preference for the "implementer" team role preference as "implementers" tend to be inflexible and slow to respond to new possibilities (Belbin, 1981; p. 22).

2-Does not act to solve a conflict with a team member

One team member, Joseph, became the "crack" of the team with his ability to bring new things to the team done in a very nice way. A critical incident occurred in the first semester when L6 decided to give Joseph additional task (tank design) thinking that Joseph was the most suitable one with his qualifications to do so. Next page explains what happened.

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1-INEFFECTIVE LEADERSHIP

Identifies the problem but does not act

> *I can clearly see that he (Joseph) did not really grasp why I had given him this task. He* ***complained that he was doing the most work****. The truth is that I don't really think that it was excessive; he was the only one able to do a good job of the PFD. Let's see if I can talk to him this afternoon".*
>
> Journal entry from the 5th week

Although the leader realized that he should talk to Joseph, he made no entries regarding his conversation with him to explain the rationale behind his decision and to explain why his workload was fair (if this was really the case). This behavior could be explained by his "affiliative" style because the primary objective of this style is to create harmony and avoid conflict.

At the beginning of the second semester, the leader commented that this member had little desire to return to the project. In the following days, it can be observed from leader's explanations that Joseph was becoming rebellious and seemed to be losing motivation. The aforementioned incident may explain the reason for Joseph's decreased motivation in the second academic semester.

3-Does not take charge of solving the problems of the team member(s), does not provide support or practical guidance

During the second academic semester, the team members had encountered two major difficulties. The first difficulty was related to a member's problem in finding the corresponding data for the compounds that were being used in the project. The leader assumed that the member had knowledge and skills to do the job and solve the problem on his own. When the leader realized that the member couldn't accomplish the task, he did not provide the member with practical support or guidance; instead he got disappointed with this member.

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Identifies the problem but does not act

The fragments related to this first occasion are presented below;

> *David has got stuck trying to find data. This should not happen. He is the most experienced but he has got stuck on something that is rather bit stupid.*
>
> Journal entry from the 14th week

> *I think that **I have over valued David**. I gave him some tasks to complete because I thought he would know how to do them as he was repeating the year but he has failed to do them.....One of the most difficult things for them was to find the corresponding data. They had huge problems in finding the most basic data despite their products being very common. **I can't imagine what will happen to them next year when they will have subjects such as thermodynamics**.*
>
> From the entry made on the 19th week

The second difficulty for the team was having to make continuous corrections and changes to the project throughout the academic year. The members were tired of all these changes and mistakes. The leader did not try to help or guide members in resolution of these technical problems.

> *We have been correcting the errors throughout the academic year and they also made some changes in the temperature which implied a change in the exchanger. Emma does not seem as tired as Jordi but she is tired of having to change the temperatures that do not fit.*
>
> Journal entry from the 21st week

4-Does not take charge to accelerate the project schedule

Apart from the difficulties explained before, the team also started to fall behind the schedule. The leader, though recognized the problem, did not take any corrective action to make-up for the lost time and accelerate the project schedule. He rather waited, believing that the team members would solve the problem.

ISBN:978-84-693-5423-0/DL:T-1414-2010

1-INEFFECTIVE LEADERSHIP

Identifies the problem but does not act

See the exemplary entries given below;

> *There is little time left and so many still things to do. Let's see if we can finish the exchanger as soon as possible. It has taken so much time….. I can't believe it. I don't feel as calm as the previous semester. There are still key things remaining to be done in the project and the end is still nowhere in the site (a part from the project entry deadline, of course). Nevertheless, I have confidence in them; I know that they are perfectly capable of finishing the project and doing things well.*
>
> Journal entry from the 21st week

> *3 weeks left before the end of the project. How the time flies. We are entering the final sprint. I hope nobody fails..*
>
> Journal entry from the 22nd week

5-Does not motivate people to endure challenges and work through tough times

The leader realized that the team members were burned out with the project (as they needed to make a lot of changes to the data, etc.). Nevertheless, he did not take responsibility for energizing and motivating the members through tough times. Instead, this was left to another team member (see the second quote below).

> *The members looked tired, especially mentally and now they want to reach to the holiday times. However, there are still things to do. This work fatigue has not decreased; even it has increased a little bit. In part because the time is running out and they know clearly that there still remain things to be finished.*
>
> Journal entry from the 21st week

> ***Joseph, on the contrary, is the one who is pushing the team**. Now we will see if the other members' are at his level and if we finish it in the way I hope.*
>
> Journal entry from the 22nd week

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1-INEFFECTIVE LEADERSHIP

Identifies the problem but does not act

6-Does not seem concerned about finishing things at the very last moment

From his writings, the leader appeared to show no concern about project tasks being finished off at the last moment. They also show that this situation was going on for some time. Yet, the leader did not take corrective action even after a team member had mentioned her discomfort with the situation. He found it normal.

> *The project has been handed in. The last few days have been intense, a lot of hours in the library with the team running around trying to resolve doubts particularly concerning, the format. This is normal given that it is their first project….For some days that Emma has been commenting that* ***she was finding it very stressful doing things at the last moment and I suppose that this project must have been very hard for her****. But I hope that nothing very serious has happened.*
>
> Journal entry from the 9th week

7-Does not seem to be particularly concerned about last-minute mistakes and corrections

At the end of both academic semesters, there were last-minute mistakes in the poster and in the final report. The leader did not ensure that the mistakes were changed adequately.

> *Today they had to correct a small thing before going to print it. They had some problems with Word. For the moment it should not be a big thing. Let's see if I speak to any of them.*
>
> Journal entry from the 9th week

> *Fine, it is finished partially. The project has been delivered. We have found one mistake in the report but I think it will affect few things.*
>
> Journal entry from the 20th week

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1-INEFFECTIVE LEADERSHIP

Identifies the problem but does not act

8- Expects certain behavior but does not set a personal example

This incident occurred three weeks before the end of the project when the team needed to finish the key tasks for the project (22nd week). That week there was no team meeting as the leader had to go on a course organized by DOW. In the same entry to the journal, later he continued saying that:

> *I want to comment on two members, David and Joseph. Firstly they are absent; the truth is that I don't like this situation because* ***nobody should be missing at this stage****. Basically, I am saying this because they were missing on one of the days that they had arranged to meet. This hinders the progress of the task and creates a bad climate.*
>
> Journal entry from the 22nd week

The leader expects from team members to be present at the team meetings during such a critical time, but as a leader he himself cancels the meetings in a week that was critical for the project.

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2-POSITIVE CHARACTERISTICS

Is self-aware

It appears that to some degree, was aware of his personal characteristics. For example, he was aware of; (a) his natural tendency not to explain his feelings, (b) his discomfort in the role of leadership due to his team role preferences, (c) his indecisiveness, and (d) his areas of development in relation to meeting management (staying on track, paraphrasing, etc.).

Is kind

It was observed that this leader's manners of expressing his thoughts (regarding the people or situations) were kind and that he paid attention to the words he was using. The following example illustrates this;

> *Sometimes I think that they have too much respect and (I know this is a very ugly and inappropriate word but) that they are too obedient.*
>
> Journal entry from the 7th week

The kindness of the team leader can be explained by his preference for the "teamworker" role because teamworkers are very diplomatic and have a strong interest in communication (Belbin, 1981; p.21, Belbin, 1993; p.68).

Sense of humor

The leader was able to laugh at himself in his journal entries. For example, it has been previously explained that he was very nervous of being the first leader to finish the meetings. He adds on to this saying that;

> *It may be that I am a **meeting genius** and that I am capable of condensing what is incondensable.*
>
> Journal entry from the 5th week

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4.2.2.2. BEHAVIORAL EVENT INTERVIEW (BEI)

This section reports the results of the analysis of the behavioral event interview (BEI) conducted with L6. Table 4.23 provides the date, the location, and the duration of the interview.

Table 4.23: Date, location and duration of behavioral event interview with L6

Date	Location	Duration
17.04.2008	Adolfo Roland Room	51.29 minutes

The results are presented in three subsections.

1st subsection: *Leadership Behaviors*. This subsection presents quantitatively those effective leadership behaviors coded in the BEI of L6 in terms of proficiency levels, competences, and the type of behavioral descriptors.

2nd subsection: *Qualitative Analysis of Critical Events*. This subsection provides qualitative descriptions of the critical events described by L6 during the interview and provides his thoughts, feelings and actions regarding these incidents. This subsection also clarifies whether the critical events described in the BEI matched with those explained in leader's learning journal.

3rd subsection: *Other Interview Questions*. This subsection presents the leader's responses to the interview questions regarding: (1) the past experiences that had helped him to perform the leader role, (2) what motivated him to take on the leadership role, (3) the typical tasks he had carried out in a given week when he was leading the project team.

(1) Leadership Behaviors in L6's BEI

The interview section related to the critical events was coded according to the frequency with which the leadership behaviors occurred. The results are illustrated in Figure 4.9 along with those of the group of eleven leaders.

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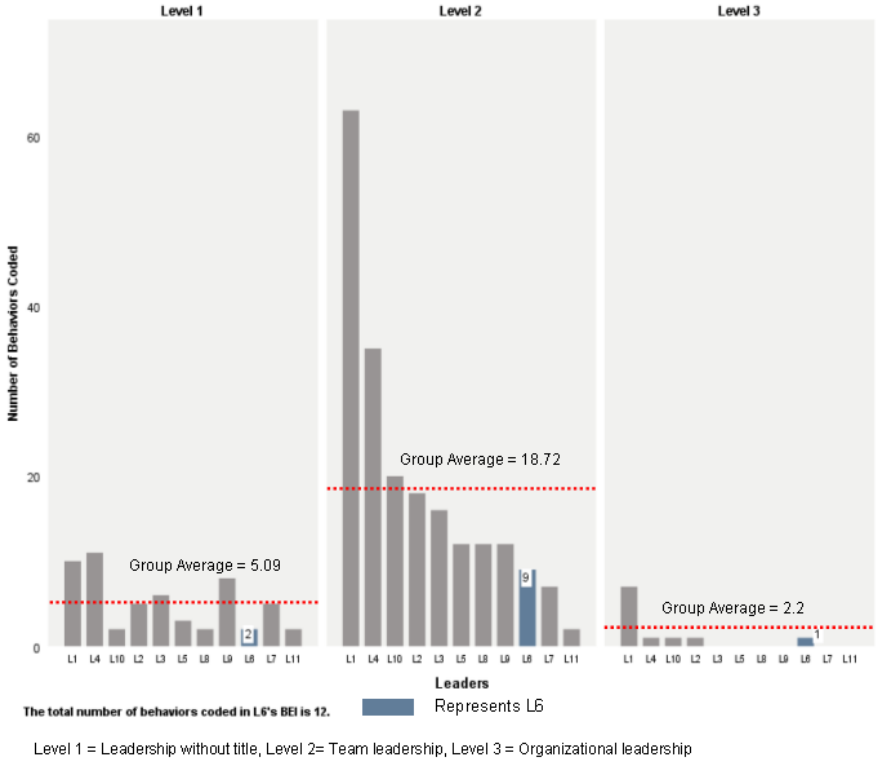

Figure 4.9: Frequency distribution of the 12 coded behaviors in L6's BEI across three proficiency levels and how this compares with the group of eleven leaders

A total of 12 leadership behaviors were coded in L6's BEI. The frequency distributions of these behaviors across three proficiency levels were as follows:

2 behaviors at level 1 (leadership without title),
9 behaviors at level 2 (team leadership), and
1 behavior at level 3 (organizational leadership)

The above figure also seeks to illustrate where the L6 stood in the group of 11 leaders in terms of the number of behaviors coded in the BEIs. It would seem that, the number of behaviors coded in L6's BEI was **below the group average** at each proficiency level. From the data in Table 4.24 it can be observed that **a very narrow range of** behaviors were identified in L6's BEI; the most frequently coded behavior being "*provides a balanced view of members' strengths and weaknesses"* followed by the behavior "*demonstrates caring leadership"*. The remaining behaviors were coded only once.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.24: The frequency distribution of the 12 coded behaviors in BEI of L6 across proficiency levels, competences and behavioral descriptors

Level	Competency	Behavior		Frequency
Level 1	Commitment to Learning	1	Is willing and open to receive feedback.	1
	Client Orientation	2	Treats clients kindly and respectively.	1
	Total in level 1			**2**
Level 2	Commitment to Learning	1	Provides a balanced view of members' strengths and weaknesses.	5
	Results Orientation	2	Does not shy away from evaluating the work of others.	1
		3	Confronts people with performance problems.	1
	Teamwork	4	Demonstrates caring leadership.	2
	Total in Level 2			**9**
Level 3	Commitment to Learning	1	Helps others to discover their capacities and potential.	1
	Total in Level 3			**1**

These results largely agree with those found in the learning journal. The range of the coded behaviors in the journal was also very narrow (see Table 4.19). Yet, this range was even narrower for the behaviors coded in the interview. For both tools, the most two frequently coded behaviors were the same, these being; "*provides a balanced view of members' strengths and weaknesses"* and "*demonstrates caring leadership*".

(2) Qualitative Analysis of Critical Events in L6's BEI

This section summarizes the critical events described by the leader in the form of a table (Table 4.25). This table seeks to present:

(a) a narrative description of the critical events described (1st column of Table 4.25)

(b) whether the leader acted upon these incidents (2nd column of Table 4.25)

(c) the number of behaviors coded in each event (3rd column of Table 4.25)

(d) the leader's thoughts, feelings and actions regarding these events (4th column of Table 4.25)

(e) the match between the events described in the BEI and the ones

ISBN:978-84-693-5423-0/DL:T-1414-2010

explained in the learning journal (5th column of Table 4.25)

During the interview, the leader explained 5 critical work events (1st column of Table 4.25); three of which were linked to the team members. The other two incidents were external to the team. One of these was associated with the scheduling of the first year exams and the other was linked to one of the project clients.

It can also be observed that the leader **did not act upon three of the five critical events** he explained during the interview (2nd column of Table 4.25). The leader did not take action on the critical events relating to: the scheduling of first year exams (event 2), the project client with low grades (event 4), and the lack of motivation in one of the members (event 5).

These events and the leader's feelings and thoughts associated with them are described in detail in the following paragraphs (4th column of Table 4.25) which begin with the incidents that the leader did not act upon (events 2, 4, and 5).

For event 2, the leader felt **impotent** to change anything regarding the dates of first-year final exams. He believed that those dates were fixed and so he did not act.

For event 4, the leader thought that it was an unfair to have clients with differing evaluation criteria and one of his team member's grades was negatively affected by this situation. However, he **did not take the initiative** to speak with the client to try to resolve the situation.

For event 5, the leader **could not provide clear evidence** of how he had motivated this *unmotivated* member. However, when the leader saw that Joseph was eager to learn, he wanted to motivate this member more. His way of motivating, which was to tell him "*Come on, take more work on, as much as you want, as much as you can*" made the member believe that the leader was giving every task to him. It could be said from this incident that the leader's way of motivating the member was actually demotivating.

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Table 4.25: The critical events explained by L6 during the BEI

Events		Action Taken	# Behaviors Coded	Leader's feelings, thoughts, and actions about the event	Exists in the journal
1	A member lacked motivation throughout the whole year. The other members were upset because this meant that they needed to do this member's part of the project in addition to their own.	Yes	5	The leader spoke with the member several times to try to get the member to reflect on what he wanted from life. L6 tried to assign the member to those tasks that he thought the member would like. Consequently, he felt ***very impotent*** when he saw that the member was not changing.	Yes
2	The exam dates of the first-year course coincided with the project delivery. The members did not know where to concentrate their efforts; on the project or on the exams.	No	0	He thought that the exam scheduling was illogical but he felt ***impotent*** to change anything. He thought that he could not change anything as the exam dates were fixed. Therefore, he did not act.	Yes
3	A member was not paying attention during the team meetings.	Yes	1	He said that he was ***not very persuasive*** and he thought that his ***permissive*** nature might have caused this situation. He felt that he was ***invisible***. Therefore, he warned the member by making the ***friendly*** comment; "I am here; I am speaking, so listen". Consequently, the member became more attentive.	No
4	A project client gave a low grade to one of his members during the poster session which meant that the member got a low grade for the project overall. The leader thought that this was unfair because this client's evaluation method differed from that of the other clients.	No	2	The leader did not think that the evaluation criteria of clients were equal but he did not act to resolve this situation with the client. Instead another leader took the initiative to solve it.	No
5	Another team member seemed to lack motivation from the beginning of the year.	No	4	The leader could not explain clearly how he had detected this lack of motivation from the beginning of the project and he provided no evidence to show how he motivated this member.	Yes
Total Number of Behaviors Coded			12		

ISBN:978-84-693-5423-0/DL:T-1414-2010

Up to now, the focus has been on those critical incidents that the leader did not act upon. Next, we will examine the two incidents in which the leader did act (event 1 and event 3).

For event 1, the leader held several conversations with the member to make him reflect on what he wanted from life. It appears that the leader's action did not work; the member did not change and the leader felt very **impotent** for not being able to change the member and his behaviors. Consequently, he lowered his evaluations of this member.

For event 3, the leader thought that his permissive nature was causing the member to be inattentive during the meetings. In the following meeting, the leader confronted the team member. From this incident, it also became clear that for the leader found it difficult to confront people directly. This behavior might again be explained by his "affiliative" style and his "conformity" value.

It can be seen that all five incidents explained by L6 during the BEI were negative work events. During the interview the leader was encouraged to explain positive work events as well but he did not, because **he believed that there had been no big achievements in the project**.

It should be noted that the leader did not describe in his journal all of the incidents he explained in the interview (5th column of Table 4.25). For example, the events related to two unmotivated members (event 1 and event 5) and the scheduling of the first-year final exams (event 2) were explained in the learning journal. However, the other two incidents, the ones associated with the inattentive team member (event 3) and the low-grading project client (event 4) were not mentioned in the journal.

(3) L6's Responses to Other BEI Questions

This section summarizes L6's responses to the other open questions of the BEI, these being: (1) the past experiences that he thought had helped him to perform leadership role, (2) the reasons why he wanted to become a leader, and (3) the typical weekly tasks he carried out when he was leading the project team.

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Past experiences that helped the leader to carry out his role

Before entering to the ETSEQ, the leader mentioned that, **he did not have any previous examples of leadership experiences**. The year he started (when he was a first year student) he had a team leader who according to L6 was very competent. Consequently, L6 **tried to imitate** what this team leader had done in the first year.

His reasons for taking on the leadership role

The leader volunteered to become a team leader to develop those aspects which he knew he was not good at, these being: persuading people, setting the direction, driving people, and self-confidence. He mentioned that these aspects were difficult for him. L6 said that he was always easy to persuade; people put him where they wanted. This last point again could be associated with the leader's preference for the "teamworker" role as team workers can be easily influenced (Belbin, 1981; p.21).

Typical project tasks carried out by the leader in a given week

The leader explained that, in a typical week, he was doing the following three tasks;

Preparing the meeting agenda: The leader prepared the meeting agenda during the weekend and sent it to the team members via email one day prior to the meeting so that the members could get prepared beforehand. His meeting agenda included: pending topics from the last meeting, following up the assigned tasks, identifying tasks that needed correcting, etc.

Coaching sessions: After preparing the meeting agenda, the leader checked out whether any member was in need of coaching. In fact, he did hold many coaching sessions[2]; the leader said that he had held only one personal coaching at the beginning of the academic year.

Meeting: The leader did not provide clear and detailed explanations regarding the team meetings. He mentioned that meetings were normally calm. They dealt with every point in the agenda during the meeting,

[2] The leader said that he was lucky because his members were so competent that they did not need much coaching.

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sometimes quickly. He also mentioned that every time a task was finished, the member responsible for the task explained it to the other members.

4.2.2.3. 360 DEGREE FEEDBACK

This section presents the results of the 360-degree feedback given to L6. All team members and the team leader participated in the process.

The results are presented in the following order; (1) the comparison of L6's self and member ratings with those the group of eleven leaders, (2) the degree of congruence between L6's self rating and the ratings given by his team members as measured using the process developed by Atwater and Yammarino (1992).

Figure 4.10a and Figure 4.10b compare the member and self ratings of L6 with those of other leaders respectively. Member and self ratings are averaged across eight leadership competences to obtain an overall leadership rating.

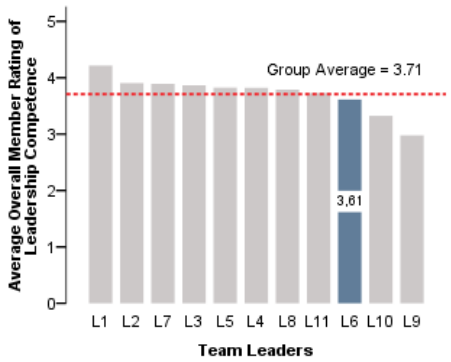

Figure 4.10a: Comparison of L6's average member ratings with other leaders' ratings

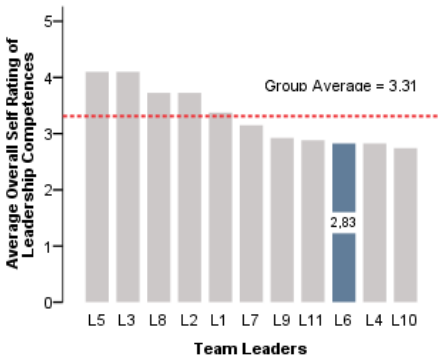

Figure 4.10b: Comparison of L6's average self ratings with other leaders' ratings

According to the ratings provided by the team members, **L6 was the 9th most effective leader out of the 11 leaders** (member rating = 3.61). His average self rating (self-rating = 2.82) was also in 9th position in the group of 11 leaders. Both the member and self ratings of this leader **were below the group average**.

ISBN:978-84-693-5423-0/DL:T-1414-2010

The congruence between L6's self and member ratings is displayed in Table 4.26. It can be seen that L6's difference score was more than one-half standard deviation below the mean difference. This means that **L6 was an under estimator**.

Table 4.26: Mean difference, one-half standard deviation, L6's difference score and agreement group

Mean difference (N=11)	0.5 SD	L6's difference score	Agreement Group
-0.42	0.26	-0.78	Under estimator

Note: Mean difference – 0.5 SD = (-0.42-0.26) = -0.68

This can also be observed in Figure 4.11, which compares the team leader's self ratings with the ratings provided by his team members for each of the eight competences. It can be seen that L6 *underrated* himself relative to his team members in all competences.

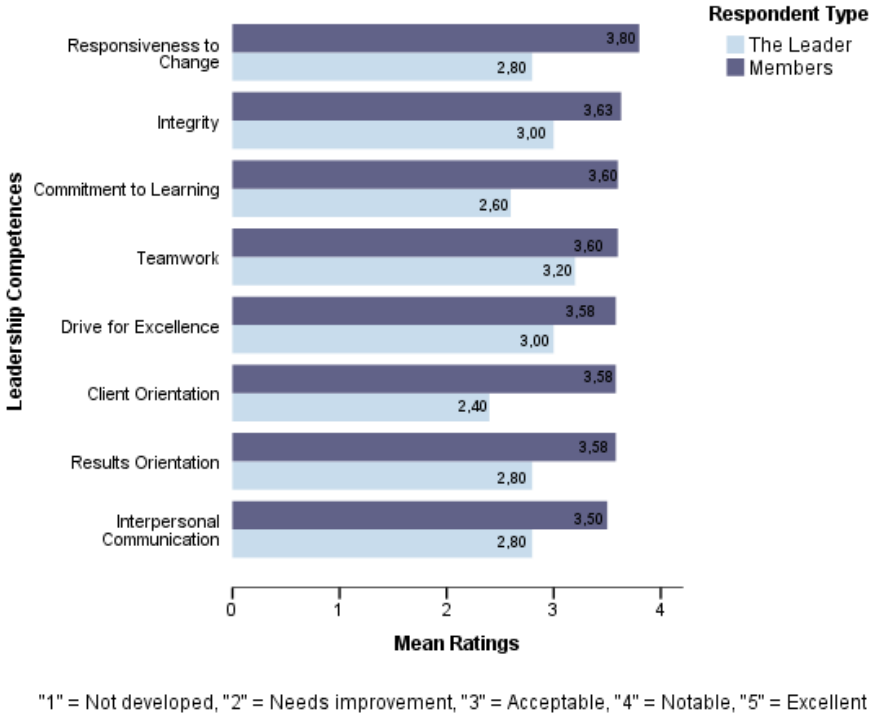

Figure 4.11: L6's self and member ratings for eight leadership competences evaluated in 360 degree process

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

In addition he rated his effectiveness as "needs improvement" in five of the eight competences that were evaluated, these being: "responsiveness to change", "commitment to learning", "client orientation", "results orientation" and "interpersonal communication".

The reason why the leader underrated his leadership effectiveness may be explained by her preference for "introversion" because introverts tend to have low self esteem (Cheng and Furnham, 2003).

The second interesting thing about Figure 4.11 is that member ratings for L6 did not vary too much between competences (member rating ranged between 3.50-3.80; acceptable level). The two competences for which L6 received the highest member ratings were: "responsiveness to change" ($M_{members} = 3.80$) and "integrity" ($M_{members} = 3.63$).

The result regarding the "responsiveness to change" competence was surprising because this competence was not observed in either the leader's journal or in his behavioral event interview, yet L6 received the highest rating in this competence.

The result regarding the "integrity" competence, however, was not surprising. This can be explained by the leader's "ISTJ" personality type. This type places great importance on integrity and it is possible that his members witnessed the behaviors related to this competence. It can be seen that the leader also evaluated himself high on this competence.

The competences for which L6 received the lowest member ratings were: "drive for excellence", "client orientation", "results orientation", and "interpersonal communication".

4.2.2.4. FOCUS GROUP

This section presents the results drawn from the analysis of focus group conducted with the members of L6. Table 4.27 displays the date, location, duration and the participants of the focus group for this leader. It can be seen that of the six members of the team, four of them participated in the focus group.

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Table 4.27: Focus group date, location, duration and participants (L6)

Date	Location	Duration	Participants
23.04.2008	Meeting room (2nd floor ETSEQ)	23.07 min.	Marc Emma Joseph Jordi

Team members were asked to respond to target questions regarding their leader (L6). Table 4.28 depicts the seven themes that emerged from the focus group.

The first theme was concerned with the **leader's responsibilities in the team**. According to the team members, L6 was doing two things in the team: correcting the reports and guiding the members. At times, the leader helped the members but more often than not he told them to see the professor.

The second theme also shows that the **leader's help and involvement** in the project was perceived to be fair by the members. From these two first themes it appears that the leader did not get very involved in the development of the team members; instead he depended exclusively on the course professor for this purpose.

The third theme was related to the leader's **skill in giving and receiving feedback.** The three following patterns were identified from the members' responses: (1) the leader gave feedback only on the format of the reports; (2) the leader did not give positive feedback; and (3) the leader accepted feedback from members (he accepted his mistakes).

The fourth theme was related to the **members' relationship with the leader** and the results showed that the leader was perceived to be apart from the team. Earlier, it has been mentioned that even though the leader liked contact with team members out of the project formal hours, he did not initiate it; instead the members approached him. This would explain why the leader seemed distant to the team members.

The fifth theme reflects members' opinion regarding the **leader's skill in project planning**. In their opinion the project was not planned well (in the second semester); furthermore, the leader did not recognize any mistakes that had been made in the project.

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Table 4.28: Main themes emerged from the focus group with L6's team members

Dimension		Member Responses
1	*Responsibilities and functions of the leader in the team*	According to the team members, this leader carried out two main functions in the team: (a) correcting the reports and (b) guiding the members when they did not know something. He guided the members by telling them ***to go and see the professor in charge***. The members added that the leader himself also helped them *sometimes*.
2	*Leader's involvement and help in the project*	The members were of the opinion that leader's involvement in the project, in comparison to other leaders, was ***just***. In their opinion, some of the other leaders got too involved in the project. According to the members, the leader was doing what he needed to do. The members explained the level of help provided by the leader as ***neither to little, nor too much***.
3	*Giving and Receiving Feedback*	The members said that the leader *based his feedback on the format of the reports*. The members said that ***they had not received any positive feedback or recognition*** for a job well done. More importantly, one member said that the only time he had received a positive feedback he had had to ***prize it out of the leader's mouth***. The members said that the leader was open to receiving feedback from the members and on one occasion showed that he accepted his mistakes.
4	*The relationships with the leader*	The members felt ***comfortable*** with the leader and they felt ***valued*** by him. However, they saw ***the leader as being apart from the team***; rather than just another team member.
5	*Project Planning and mistakes in the project*	The members felt that the leader ***did not plan the project properly*** in the second semester; the members needed to make many changes. This was because a task (exchanger) was initiated and completed without the appropriate temperatures. A member commented that ***the leader did not realize the mistake*** until the task had been finished.
6	*Conflict Resolution*	The members commented that the leader ***did not know how to solve a conflict with one of the members***. One of the members was neither doing the tasks assigned to him nor attending the team meetings. When the participants were asked about how the leader handled the situation they said that the ***leader had given that member less work***. However, the members believed that the leader should have: (a) got more involved with the situation, (b) talked to the member in a more serious manner, and (c) taken some measures.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.28 continued

Dimension		Member Responses	
7	*Inspiring, Motivating, Mobilizing*	Inspiring	The team members reported that during the project the leader ***did not clearly transmit*** the importance and the objectives of the integrated design project (apart from mentioning it at the start of the project). ***Neither did he inspire*** them regarding the importance of teamwork, the project or the future that they were working for.
		Motivating	The members claimed that the most distinguished thing about this leader was ***his lack of desire***. They said that the ***leader did not really motivate them too much***. The leader was writing at the end of every email "*come on, this will finish*". However, the members would like that the leader had motivated them more. Here, it can be observed that the leader's way of ***motivating was based on written communication*** and on one sentence.
		Mobilizing	In view of members' responses, it became apparent that the leader ***did not "mobilize members to act".*** In the exemplary incident explained by the members, the leader told them: "Three weeks left and you still don't have the project". Instead of hearing this sentence, the members preferred that the leader said or did things to energize or to move them.
8	*The best thing about the leader*	The best thing the leader did was to check if the ***tasks were delivered on time***. However, he did not control the members; instead he wanted the members get on with the tasks by themselves.	
9	*Do the members want to work with the same leader again*	One member said that he would not like to work with this leader again in the future, another member added that he would like to work with him as a colleague. Another member said that he would prefer to have this leader rather than some unknown leader.	

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The sixth theme demonstrated that the **leader rewarded underperformers** in the team by assigning them less work. The members believed that the leader should have taken more drastic measures against this situation. The leader told the members that he had spoken with this member however; the members neither knew what the leader had said to this member nor did they know how the leader had evaluated this member's performance.

The seventh theme showed that the leader was **not perceived as inspiring, motivating and mobilizing** by the members of the team. The members identified "the lack of desire" as the worst thing about this leader.

The best thing the members identified about this leader was "checking if the tasks were delivered on time".

Members' responses to the question "would you like to work with the same leader?" varied. One said he would not like to work with this leader again, the other said he would prefer L6 as a colleague rather than a leader and another member said he would prefer L6 over some unknown leader.

4.2.2.5. TEAM CLIMATE

This section presents the quantitative and qualitative analysis of the team climate data for L6's team. The quantitative data presents the average member and leader ratings for the 22-item survey. The qualitative results collect respondents' answers to the two open questions of "*what did you like most and what did you like least about the project*".

Table 4.29 summarizes for each semester, the survey administration date and the number of members who responded to the survey.

Table 4.29: Administration dates and number of respondents for the team climate survey for L6's team

Semester	Administration Date	Respondents
First Semester	11.12.2007	All six team members and the team leader
Second Semester	12.05.2008	All six team members and the team leader

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The results of the survey are illustrated in Figure 4.12. The first interesting thing about this figure is that the ratings of the members and the ratings of the leader were very similar in both of the academic semesters.

The second interesting thing is that this team's climate ratings, based on the members' ratings, were very close to the whole group's average climate ratings for the first semester. However, in the second semester, this team's climate ratings were below those of the group. This was because both the members and the leader gave lower ratings on three of the survey items in the second semester (Table 4.30).

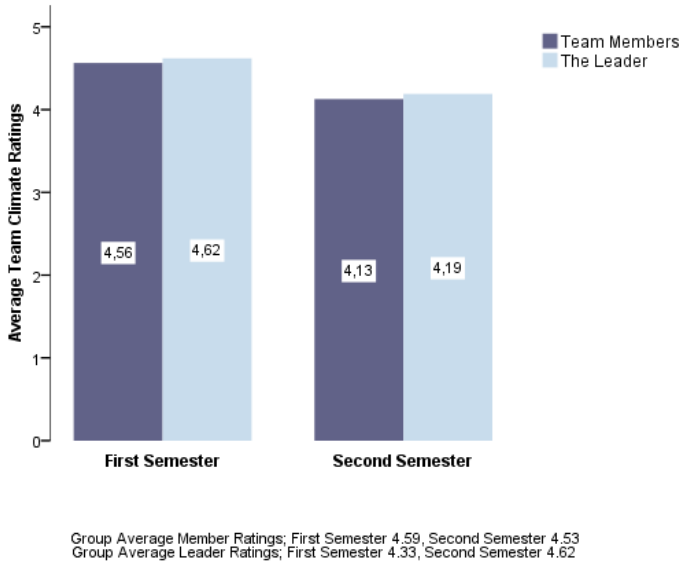

Figure 4.12: Team climate survey result for L6's team according to respondent type and the academic semester in which the survey was administered (ratings are averaged across 22-survey items). Response scale goes from "1" =*totally disagree* to "6" = *totally agree*

The members, in the second semester, "somewhat disagreed" that *all the members of the team were working with a high level of commitment*. The leader himself was in general in disagreement with this item in the second semester (leader rating = 2.00).

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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The members and the leader "strongly agreed" that the job *was being done by the same group of people* in the second semester (member rating = 5.50, leader rating = 6.00).

Table 4.30: The three survey items for which the respondents decreased their ratings from first semester to the second semester

		Team Members		Team Leader	
		1st semester	2nd semester	1st semester	2nd semester
Q1	All the members of the team work on the project demonstrating a high level of commitment and energy.	4.33	3.00	5.00	2.00
Q8	A large part of the project is being done by the same person or the same subgroups of people. [R]	3.33	5.50	2.00	6.00
Q9	Our team resolves conflicts in an open and constructive manner.	4.50	3.67	4.00	5.00

Note [R] means that the item was reversed. *Response scale*: "1" = Totally disagree, "2" = Mostly disagree, "3" = Somewhat disagree, "4" = Somewhat agree, "5" = Mostly agree, "6" = Totally agree

The leader and the members differed in their perception of the 9th survey item in the second semester. Members "somewhat agreed" that *the team solved the conflicts in an open and constructive manner* in the second semester whereas the leader "mostly agreed" with that item.

The participants were also asked to state the thing(s) they liked most and the things they liked least about the project. The participants' responses are presented in Table 31.

It appears that in the first semester **the team members liked** teamwork, getting to know the other members and they thought the project was easier and more fun when they worked as a team.

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

What **they did not like** was the lack of time they had to complete a lot of things. Also, in the second semester the members were uncomfortable about the underperforming members in the team (three members mentioned this aspect).

The verbatim comments of the leader in both semesters reflected his satisfaction with his team (Table 4.31). Both the quantitative analysis and the qualitative analysis of the team climate demonstrated a worsened climate in the team due to conflicts arising from the underperforming members of the team.

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4.31: Verbatim comments by L6 and his team members regarding what they liked most and least about the integrated design project

		Positive Comments	Negative Comments
First Semester	Members	Getting to know the other members of the team. Teamwork Studying the subjects in depth and above all learning how to apply everything we do in the classes. Teamwork makes the project more enjoyable and easier. Trying to work with the other members and getting to know each other better. We are doing fine in the team. We respect each other. I am very happy with this team.	Time allotted to work on the project. A lot of work in very little time. The amount of work. Most of the time you don't know which way to approach the subject or where to start because things are explained very fast in the class.
	Leader	The good climate in the team. This is a good team that facilitates things.	There has not been time to learn the concepts explained in the PMP before taking on the leadership role. There has been a lack of communication with PMP professors and first-year course coordinators.
Second Semester	Members	Involvement of members in the project. Teamwork although not with all of the members. We are motivated when we work as a team.	Not every team member worked equally. There was too much to do in too little time. Two members did not care about the project. One of the team members has not worked. He was not concerned about the project or about the poster. Measures should be taken in the team when one of the members is not doing anything.
	Leader	The final result and the good climate	

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ISBN:978-84-693-5423-0/DL:T-1414-2010

4.3. COMPARATIVE SUMMARY FOR THE TWO CASE STUDIES

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

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L1	L6
Test Results	***Test Results***
• Shaper, Completer Finisher • Authoritative, Coercive • ISTJ • Benevolence, Conformity	• Implementer, Teamworker, • Affiliative, Coaching • ISTJ • Hedonism
L1's willingness to take on the leadership role dated back to her 1st year studies and since then, she knew she would want to be the team leader in her sophomore year. In fact, along the way from 1st to 4th year, she exercised leadership in her 2nd year and she found herself quite comfortable in this role. Her comfort in the leadership role is quite understandable in the view of her preference for "shaper" role and for the "authoritative" style. That's because shapers, on one hand, like to lead, challenge, and to push others into action and the authoritative style, on the other hand, provides a clear vision that motivates the people to be creative in their pursuit of the established objectives. These two preferences of L1 suggested that she would demonstrate effective leadership behaviors when performing the leadership role.	L6 volunteered to take on the leadership role with the intent to develop those skills he believed he lacked, these being: influencing persuading and driving people, setting the direction, and self confidence. All those aspects in fact could be considered as some of the vital aspects of effective leadership. L6's desire to develop the above-mentioned aspects is understandable considering his preferences for the "teamworker" role and "affiliative" style. Firstly, "teamworker" role is not one of the leader roles suggested in a team. Teamworkers tend to get easily convinced. This might explain why L6 wanted to develop his persuasion skills. On the other hand, the affiliative style is focused on maintaining the harmony in the team rather than setting the direction for the team.

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L1	L6
In fact, L1 had a large repertoire of leadership behaviors from which she chose the appropriate one according to the demands of different situations. One hallmark characteristics of L1 was her inspirational, motivational and encouraging way of leading. Relentlessly, she emphasized the importance of the project and the teamwork to her team members and she catalyzed the members to act. Clearly, L1 was a leader in action. She did not wait and hesitate to take action against the critical incidents she encountered. As a leader, she demonstrated a genuine interest and concern for her team members, their problems, their learning, and development and so she took first person responsibility to correct the problems and to develop her team members. She provided them with ongoing feedback for their development and performance.	Actually, L6 engaged in narrow range of leadership behaviors and he confined himself to those behaviors to fulfill his responsibilities in the leadership role. Most importantly, he failed to inspire, motivate, and encourage his members. Indeed, with his actions at times he demotivated them. He could not transmit the importance of the project and teamwork to his team members. One of the most prominent aspects of L6 was "*not taking action*". The problem was not lack of sight but rather lack of action. In his leadership role, L6 failed to provide help and guidance to the members at critical moments. He either expected them to solve their problems on their own or he told them to see course professors. He did not give feedback to the members for their development or performance; his feedback was based explicitly on the format of the reports.

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L1	L6
She continuously watched on her team members and as a skilled person at interpersonal understanding, she recognized members' problems and did not hesitate to approach them to investigate their problems personally. She took action before they became conflictive situations. L1 maintained and communicated visible performance standards and evaluated the members accordingly. She did not condone ineffective performance and confronted it immediately but at the same time she knew to give positive feedback and recognition for a job well done. She pushed the limits of her comfort zones and with all her effort, commitment, insistence, and enthusiasm, L1 achieved to build a team from those individualistic people who initially denied working in a team. It can be said that with all her qualities and behaviors, L1 earned and maintained the full trust of her team members. Therefore, it was not a surprise to find out that the members wanted to work with L1 in their future.	L6 was able to recognize and detect member problems or a conflicts but not able to take the necessary action. He enjoyed informal conversations with the members outside the team meetings but he did not initiate any of them, he did not approach them. The leader did not show much effort to manage the project and to get the job done. He failed to take action to resolve the problems of a persistent underperforming member and failed to recognize the contributions of others; he experienced difficulties to give recognition for a job well done. This leader finally was perceived by the members of his team as an unmotivated, unmotivational and distant leader who permitted underperformance in the team. Even though the members liked the idea of working in the team to the project at times they got unmotivated and got burned out with the project.

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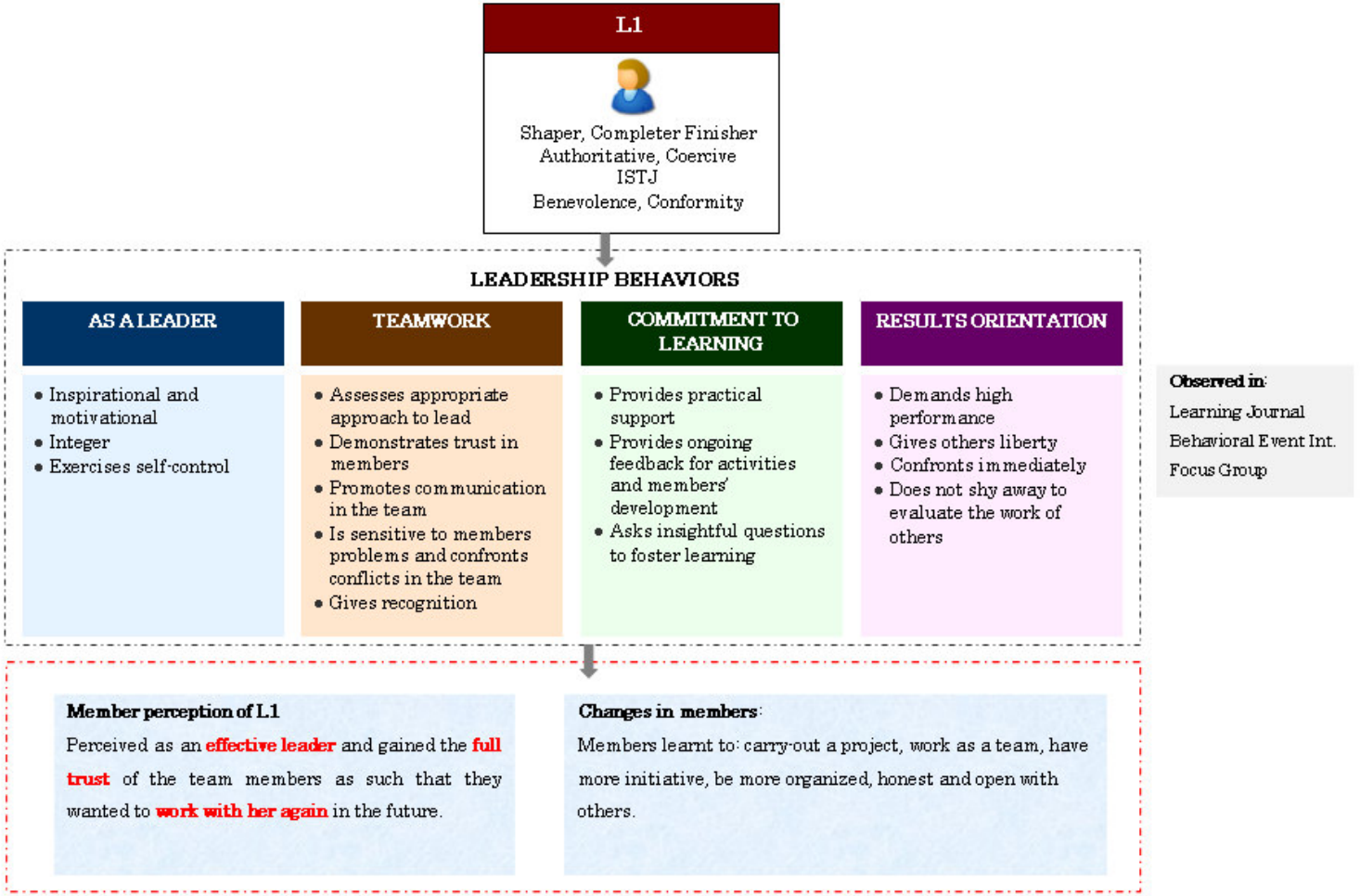

Figure 4.13: Summary of the case study 1 (L1)

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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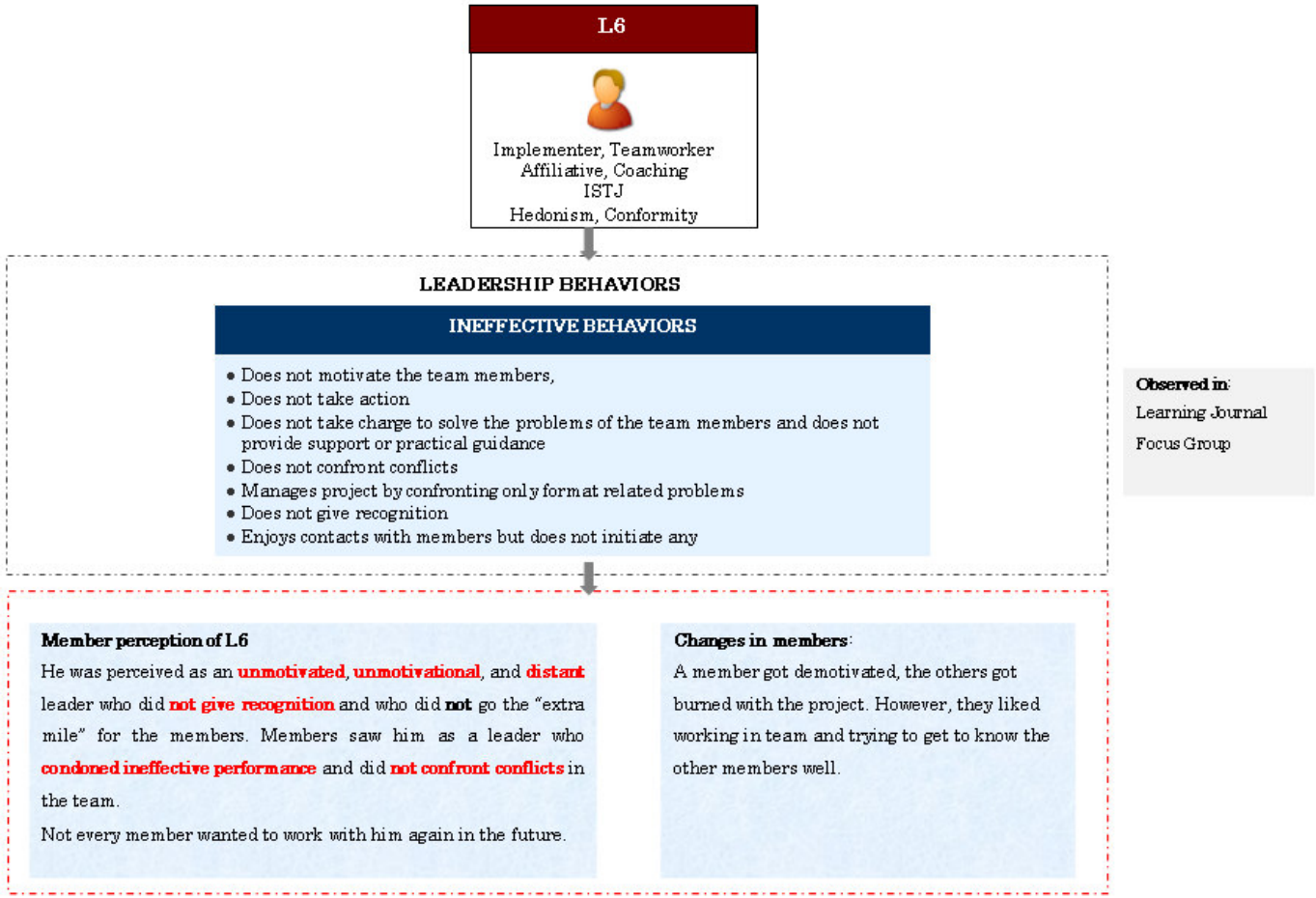

Figure 4.14: Summary of the case study 2 (L6)

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ISBN:978-84-693-5423-0/DL:T-1414-2010

UNIVERSITAT ROVIRA I VIRGILI
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CHAPTER 5

CONCLUSIONS

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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5. CONCLUSIONS

5.1. GENERAL CONCLUSIONS

The main objective of this study was to conduct an exploratory search to examine the impact of leadership on team performance. In this regard, three hypotheses have been put forward:

1. There is a positive relationship between leadership performance and team performance.
2. The leaders' personality profile impact on their leadership performance.
3. The "balanced" project teams perform better than the "unbalanced ones".

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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5.1.1. HYPOTHESIS 1

Returning to the first hypothesis posed at the beginning of this study that there is a positive relationship between leadership and team performance, it is now possible to state that:

H1a	Leadership learning is significantly and positively associated with team performance.	**Supported**
H1b	The number of leadership behaviors shown at the "team leadership" proficiency level is significantly and positively related to team performance. However, the number of leadership behaviors shown at the "leadership without title" proficiency level is not significantly associated with team performance.	**Partially supported**
H1c	The diversity of the leadership behaviors shown at "team leadership" proficiency level is significantly and positively related to the team performance. However, the diversity of behaviors shown at the "leadership without title" proficiency level is not significantly associated with the team performance.	**Partially supported**
H1d	Members' perception of leadership effectiveness is significantly and positively related to team performance.	**Supported**

UNIVERSITAT ROVIRA I VIRGILI
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This hypothesis has also been investigated in two case studies. The results from the case study 1 demonstrate that when the leader engaged in a wide range of leadership behaviors (e.g. developing members, demonstrating caring leadership, confronting the conflicts and underperformers in the team, and managing the project) the members learned to work as a team, have more initiative, are more organized and are more honest.

The results from the case study 2 demonstrate that when the leader confines himself to a narrow range of behaviors and does not act to solve various problems in the team, the members lose their motivation and get burned-out with the project.

5.1.2. HYPOTHESIS 2

The second hypothesis of the study suggests that the leaders' personality profile impact on their leadership performance.

The effect of leaders' profile has been investigated with the following five variables: (1) Belbin team role preferences, (2) gender, (3) perceived managerial styles, (4) MBTI types, and (5) higher-order value types.

1-Belbin Team Role Preferences

In general, team leaders with a clear primary preference for a "leadership role" (either "shaper" or "coordinator") tend to show better leadership performance than those leader students who do not have a primary preference for a "leadership role".

However, the only significant differences are observed in leadership learning and the number of leadership behaviors demonstrated during the BEIs.

Team leaders with a primary preference for a "leadership role" obtained significantly higher scores in the PMP course than those team leaders with other primary role preferences.

Similarly, team leaders with a clear primary preference for a "leadership role" demonstrate a significantly high number of leadership behaviors at team leadership level during the BEIs than those team leaders with other primary role preferences.

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The qualitative analysis of the eleven team leaders' learning journals together with the multidimensional scaling and multidendogram methods suggests the following:

Leaders without a primary "leadership role" preference might:	**Leaders with a primary "leadership role" preference might:**
Feel themselves uncomfortable and insecure in the leadership role.	Feel themselves comfortable in this leadership role.
Not be able to demonstrate all the leadership behaviors taught in the PMP class.	Try to improve their leadership performance.
Have problems in approaching the members and acting on their problems.	Not have problems in approaching the members and acting to solve their problems.
Experience difficulties in confronting conflicts and underperformance.	Tackle and confront more easily performance problems and conflicts in the team.

However, the results also suggest that the team leaders with a primary "leadership role" preference may not always act in a similar manner themselves. They may exhibit different types of leadership behaviors depending on their value priorities.

The results also show that there might be cases in which a team leader without a "leadership role" preference might also excel as a leader.

2-Gender

The results demonstrate that female team leaders obtain higher scores in the PMP course than their male counter-parts. However, no other statistically significant gender differences were observed in other leadership performance variables (i.e. number and diversity of leadership behaviors or members' perception of leadership effectiveness).

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3-Managerial Style

The data suggest that "authoritative" team leaders tend to show better leadership performance than team leaders with other dominant managerial styles. Due to small sample size, it was not possible to determine statistical significance of this result.

4-MBTI Types

The effect of team leaders' MBTI preferences has been investigated in terms of: (1) MBTI types (e.g. ISTJ, ENTP), and (2) four MBTI scales (i.e. E-I, S-N, T-F, J-P)

(1) The effect of the team leaders' MBTI types on leadership performance was not investigated due to small sample size. However, leaders with INTJ preference tended to obtain higher scores in the PMP course.

(2) The results demonstrate that three scales of the four scales (E-I, S-N, T-F) have no significant correlation between leadership performance variables. On the other hand, J-P scale shows a significant correlation with the members' perception of leadership effectiveness. That is to say, "judging" team leaders tend to be perceived as more effective than "perceiving" team leaders.

5-Higher Order Value Types

Although statistically not significant, leaders' hedonism value (pleasure, enjoying life) is found to correlate inversely with all leadership performance variables. In addition, self-transcendence (concern for the well fare and concern for others) correlates positively with all leadership performance variables whereas self-enhancement (pursuit of self-interest) shows negative correlations with those variables (statistically not significant).

5.1.3. HYPOTHESIS 3

The study tested whether "team role balance" is a determinant in the success of IDP teams. Performance differences between balanced and unbalanced teams have been investigated using four different measures of balance from literature. In addition to these measures, the concept of team role suitability and its effect on team performance has also been investigated.

UNIVERSITAT ROVIRA I VIRGILI
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ISBN:978-84-693-5423-0/DL:T-1414-2010

Based on a sample of 18 project teams, our results do not show any indication that balanced teams perform better than unbalanced teams when Belbin's basic concept (1981) and Senior's measures of balance (1997) are used to define team balance.

The results also demonstrate that the number of team roles represented at different score levels in a team have, indeed, no effect on performance of project teams using Won-Woo's measure (2002). No relationship is detected between team balance and team performance using Partington and Harris's balance indexes (1999).

The suitability of role pairings in a team has also been investigated by categorizing members' team roles into three different types of interaction as suggested by Fisher *et al.* (1998): (1) neither harmonious nor productive, (2) harmonious but not productive, and (3) both harmonious and productive. Based on 10 IDP teams, role pair combinations (as measured by the number of members in each interaction category) are found to be not related with team performance.

5.1.4. ADDITIONAL CONCLUSIONS

In addition to testing hypotheses, the study also has analyzed the following: (1) the sample characteristics, (2) the most common critical events faced by team leaders and (3) the leadership behaviors shown by these leaders.

1-Sample Characteristics

The personality profiles of a total of 63 students enrolled to the PMP course have been investigated using 4 tests: (a) Belbin's Self Perception Inventory, (b) Managerial Style Questionnaire, (c) Myers-Briggs Type Indicator, and (d) Schwartz Value Survey.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

The most and least preferred Belbin team roles for the 63 PMP students were as follows:

Most preferred	**Least preferred**
Shaper	Co-ordinator
Completer finisher	Plant
Implementer	Resource Investigator

This sample of students perceived their managerial styles:

Mostly as	**Rarely as**
Affiliative	Democratic
Pacesetting	Coaching

Two MBTI types (ESTJ and ISTJ) comprised more than half (57.1%) of the 63 PMP students in the present study.

The PMP students, in general, considered "benevolence" and "self-direction" as their high priority values.

2-Critical Incidents Encountered

The behavioral event interviews of eleven team leaders have been content analyzed to explore the most common types of critical events experienced by team leaders.

A total of 60 critical work events were described by eleven leaders and generally these incidents were associated with the team members. Most commonly, the leaders were confronted with member problems such as: underperformance (e.g. procrastination), motivational problems (e.g. lack and/or loss of member motivation), undesired member behavior (e.g. speaking about non-work issues in the team meetings), and members' unwillingness to work as a part of a team (e.g. preferring to work alone).

3-Leadership Behaviors Shown

Learning journals and the BEIs of eleven team leaders have been codified against the leadership competence dictionary "Alabart". Both tools yielded almost identical results:

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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- The majority of the leadership behaviors were from the team leadership level.
- "Teamwork", "Commitment to Learning", "Interpersonal Communication", and "Results Orientation" were the most frequently identified competences.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

5.2. CONCLUDING REMARKS

A number of limitations need to be noted regarding the present study. The fist limitation of this study is that the sample size was relatively small. Secondly, the competency questionnaire was not validated prior to the study.

Despite these limitations, the first strength of this study lies in the triangulation among several different qualitative and quantitative sources of data. The second strength of this study is that, to date, this is the only study that has investigated the learning journals to study the leadership competences shown by the individuals.

Based on the results of this study, it can be concluded that the leadership performance of the 4th-year student leaders is significantly linked to the performance of the 1st-year IDP teams at the ETSEQ; the better the leadership performance the better the team performance.

The results regarding the critical incidents and the leadership behaviors shown by the leader students clearly imply that the competency-based educational model implemented at ETSEQ provides the leader students with the real life experiences so that they can practice and enhance their leadership competences.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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Sibel Özgen
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Curriculum Vitae

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Publications

Co-author	Leadership Competency Dictionary Alabart (in Spanish) Alabart, J.R., **Özgen, S**., Brull, E.A., (2008) "Diccionario de Competencias Alabart, Comportamientos Clave y Excelencia Organizacional", Intellectual Property, Number: 02/2008/5511.
Refereed Conference Papers	Alabart, J.R., **Özgen, S**., Medir, M., Witt, H.J., "*How to Help Senior Chemical Engineering Students Enhance and Develop Leadership Competence*", Proceedings of the Annual Conference, ASEE, Session 1031, June 22-25, 2008, Pittsburgh, Pennsylvania, ISBN: 0-87823-196-X (oral presentation). **Özgen, S**., Alabart, J.R., Medir, M., '*A Team Leader Selection Process for Project Based Learning Experiences*", Proceedings of the Annual Conference, ASEE, Session 1552, June 22-25, 2008, Pittsburgh, Pennsylvania ISBN: 0-87823-196-X (oral presentation). Alabart, J.R., **Özgen, S**., Medir, M., Witt, H.J., "*Development of the Leadership Competence by Senior Engineering Students Through a Project-Based Learning Experience*", Research Symposium on PBL, Session 1009, June 30-July 1, 2008, Aalborg, Denmark, ISBN: 978-87-991994-5-7 (oral presentation). **Özgen, S**., Alabart, J.R., Medir, "*Implementation of a 360 Degree Feedback Assessment Process for the Development of the Leadership Competence of Senior Engineering Students*", Proceedings of the 36th SEFI Conference, Session 1134, July 2-5, 2008, Aalborg, Denmark, ISBN: 978-90-8790-571-2 (oral presentation).
Non-refereed Conference Papers	**Özgen, S**., Sanchez, O., Alabart, J.R., Medir, M., "*Developing students as leaders: What are the most critical events the leader students encounter when leading a team*?", 12th International Leadership Association Conference, Leadership for Transformation, October, 27-30, 2010, Boston (accepted for oral presentation). **Özgen, S**., Alabart, J.R., Medir, M., "*Learning Journals in Engineering Students' Leadership Development*", 11th International Leadership Association Conference, Leadership for Transformation, November, 11-14, 2009, Prague, Czech Republic (oral presentation). *Guardiola, M., Corbí, P., González, E., Soler, E., Yuste, S., Castellví, N., Just, E., Lara, D., Puig, A., **Özgen, S**, "*Meeting Observation: Enabling Engineering Students to Manage and to Facilitate Team Meetings*", International Conference on Education and New Learning Technologies, EDULEARN, July, 6-8, 2009, Barcelona, Spain (oral presentation, article). *Guardiola, M., Corbí, P., González, E., Soler, E., Yuste, S., Castellví, N., Just, E., Lara, D., Puig, A., **Özgen, S**, "*Conflict Management in a Team: Avoiding or Confronting*", 37th SEFI Conference, July, 1-4, 2009, Rotterdam, Netherlands (poster presentation). *Guardiola, M., Corbí, P., González, E., Soler, E., Yuste, S., Castellví, N., Just, E., Lara, D., Puig, A., **Özgen, S**, "*Meeting Observation: A Novel Way to Develop Engineering Students' Facilitation and Management Competences*", 37th SEFI Conference, July, 1-4, 2009, Rotterdam, Netherlands (poster presentation).

	*Guardiola, M., Corbí, P., González, E., Soler, E., Yuste, S., Castellví, N., Just, E., Lara, D., Puig, A., **Özgen, S**, "*Perception Differences on Leadership*", 37th SEFI Conference, July, 1-4, 2009, Rotterdam, Netherlands (poster presentation). *Guardiola, M., Corbí, P., González, E., Soler, E., Yuste, S., Castellví, N., Just, E., Lara, D., Puig, A., **Özgen, S**, "*The Art of Leadership: From Theory to Practice*", 37th SEFI Conference, July, 1-4, 2009, Rotterdam, Netherlands (poster presentation). **Özgen, S**., Alabart, J.R., Medir, M., Kantola, J., Vanharanta, L., "*Assessment of the Cycloid Application as a Tool to Assist Students in the Development of Personal and Social Competencies that are Key to Project Managers*", International Congress of University Teaching and Innovation, CIDUI, July 5-7, 2006, Barcelona, Spain (poster presentation). **Özgen, S.,** Nalçaci, Ö, O., Övez, B., "*Using Gracilaria Verrucosa as an Alternative Carbon Source in Biological Denitrification of Drinking Water*", EMCC 5th Chemical Engineering Conference for Collaborative Research in Eastern Mediterranean Countries, 367-370, May 24-29, 2008, Cetraro, Italy (poster presentation). **Özgen, S**., Övez, B., "*Metal Toxicity Determination using Cress Seed in Phosphate Contaminated Aqueous Media*" EMCC 4th Eastern Mediterranean Chemical Engineering Conference, January 9-11, 2006, Death Sea, Israel (oral presentation). * *Undergraduate Students Supervised*
Abstracts in Conferences	**Özgen, S**., Övez, B., "*Cress Bitki Tohumu ile Zehirlilik Testi*", XVIII. National Congress of Chemistry, Kafkas University, July, 5-9, 2004, Kars, Turkey (oral presentation). Övez, B., Yüksel, M., Saglam, M., **Özgen, S**., Alp, Y., Azak, H., "*Cress Test in Different Water Mediums*", International Conference on the Environmental Problems of the Mediterranean Region, Near East University, April 12-15, 2002, Nicosia, Cyprus (oral presentation).
Publications in Refereed Journals	Nalcaci, O.O., **Özgen, S**., Ovez, B., (2010), "Metal Contamination Characteristics of Lepidium Sativum in a Phosphate, Saline, and Nitrate Contaminated Media", accepted for publication in *Journal of Environmental Engineering*. Övez, B., **Özgen, S**., Yüksel, M., (2006), "*Biological Denitrification in Drinking Water using Glycyrrhiza glabra and Arunda donax as Carbon Source*", Process Biochemistry, vol. 41 (7), 1539-1544.

Memberships

- International Leadership Association (ILA)
- American Society for Engineering Education (ASEE)
- European Society for Engineering Education
  (SEFI - *Société Européenne pour la Formation des Ingénieurs*)

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE

DOCTORAL THESIS

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Department
of Chemical and Process Engineering

UNIVERSITAT ROVIRA I VIRGILI

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APPENDIX 1

Definitions of Leadership

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APPENDIX 1-1

DEFINITIONS OF EFFECTIVE LEADERSHIP

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"Leadership is the art of mobilizing others to want to struggle for the shared aspirations".	Kouzes and Posner, 1995
"Leadership is the behavior of an individual when he is directing the activities of a group toward a shared goal".	Hemphill and Coons, 1957
"Leadership may be considered as the process (act) of influencing the activities of an organized group in its efforts toward goal setting and goal achievement".	Stogdill, 1950
"Leadership is the accomplishment of a goal through the direction of human assistants. A leader is one who successfully marshals his human collaborators to achieve particular ends".	Prentice, 1961
"Leadership is the influential increment over and above mechanical compliance with the routine directives of the organization".	Katz and Kahn, 1978
"Leadership is interpersonal influence, exercised in a situation, and directed, through the communication process, toward the attainment of a specified goal or goals".	Tannenbaum, Weschler and Massarik, 1961
"Leadership is a process of influence between a leader and those who are followers".	Hollander, 1978
"Leadership is the process of influencing the activities of an organized group toward goal achievement".	Rauch and Behling, 1984

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"Leadership is a process of giving purpose (meaningful direction) to collective effort, and causing willing effort to be expended to achieve purpose".	Jacobs and Jacques, 1990
"Leadership is the ability to step outside the culture**…** to start evolutionary change processes that are more adaptive".	Schein, 1992
"Leadership is an influence process that enables managers to get their people to do willingly what must be done, do well what ought to be done".	Cribbin, 1981
"Leadership is the art of influencing others to their maximum performance to accomplish any task, objective or project".	Cohen, 1990
"Leaders are individuals who establish direction for a working group of individuals who gain commitment from this group of members to this direction and who then motivate these members to achieve the direction's outcomes".	Conger, 1992
"Leadership requires using power to influence the thoughts and actions of other people".	Zalenik, 1992
"Leadership is about articulating visions**,** embodying values, and creating the environment within which things can be accomplished".	Richards and Engle, 1986

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"Leadership is the ability of an individual to influence, motivate, and enable others to contribute toward the effectiveness and success of the organization".	House *et al.*, 1999
"Leadership is the process of making sense of what people are doing together so that people will understand and be committed".	Drath and Palus, 1994
"Leadership is a process whereby an individual influences a group of individuals to achieve a common goal".	Northouse, 2004
"Leadership is an attempt at influencing the activities of followers through the communication process and toward the attainment of some goal or goals".	Donelly, Ivancevich and Gibson, 1985
"Leadership is the process of influencing the activities of an individual or a group in efforts toward goal achievement in a given situation".	Hersey & Blanchard, 1988
"Leaders are those who consistently make effective contributions to social order, and who are expected and perceived to do so".	Hosking, 1988
"Leadership is a development of a clear and complete system of expectations in order to identify, evoke and use the strengths of all resources in the organization the most important of which is people".	Batten, 1989
"Leadership is an interaction between two or more members of a group that often involves a structuring or restructuring of the situation and the perceptions and expectations of members…Leadership occurs when one group member modifies the motivation or competencies of others in the group. Any member of the group can exhibit some amount of leadership".	Bass, 1990

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"Leadership is that process in which one person sets the purpose or direction for one or more other persons and gets them to move along together with him or her and with each other in that direction with competence and full commitment".	Jaques and Clement, 1994

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APPENDIX 1-2

CHARACTERISTICS OF INEFFECTIVE LEADERSHIP

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Dysfunctional Patterns in Leadership	
Conflict avoidance. Abrasive behavior. Micromanagement. Manic behavior (Pushing others and themselves to the limit). Inaccessibility. Use and abuse of subordinates rather them helping them to grow. Desire for applause. Mistrust. Need for control.	Kets de Vries, 1985-2006

Leadership derailment	
Emotionally unstable, not able to handle high pressure, defensive. Putting personal advancement ahead of personal integrity. **Weak interpersonal relationships** (insensitive, competitive, dictorial, critical, easily angered, arrogant, and manipulative).	McCall and Lambardo, 1983 Glaser, 2003

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Interpersonal skills to be watched for when an executive is about to move into a more challenging position.	
Overly ambitious (alienates others on the way up; worries more about the promotion than about doing the current job). **Arrogant** (cold, aloof leader, who is always right and dismisses others; is detached). **Betrays trust** (a leader who says one thing and means something else; fails to follow through and unpredictable). **Lack of composure** (handless stress and frustration poorly; gets hostile and sarcastic under pressure; displays unpredictable emotional responses). **Insensitive to others** (intimidating; does not care about how behaviors or words affect others; does not ask or listen; makes others feel bad and doesn't care). **Lack of ethics and values** (sets own rules of conduct; employs situational ethics; pushes the limits of tolerance).	Lombardo and McCauley, 1988

Failure to meet business objectives (leadership derailment)	
Poor administration skills (over commits and under delivers, misses deadlines, and moves on without completing the tasks). **Performance problems** (fails to hit targets, is inconsistent in meeting deadlines, is inexperienced, procrastinates, and lacks boldness and innovation). **Key skill deficiencies** (lacks critical job required talent or skill, lacks technical or functional skill).	Hughes, 2002

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Failure to build a team (leadership derailment)	
Failure to build a team (does not value team efforts; fails to resolve conflict within the team; does not build team spirit or celebrate success; fails to share credit). **Failure to staff effectively** (selects people like him or herself; does not seek or hire the most skilled people; and uses poor or inappropriate criteria, is a poor judge of talent). **Defensiveness** (can not take criticism, and either denies responsibility or blames mistakes on others; does not listen or rejects negative feedback). **Over managing** (over controls, does not empower others; fails to develop staff and direct reports; has an inability to delegate; is a perfectionist, control driven and impatient).	Ehmen et al., 2004

Self-defeating manners	
Procrastination.	Hughes et al., 2002
Defensiveness.	
Worrying.	
Hostility.	
Perfectionism.	
Suspiciousness.	
Over committed.	
Overly critical.	
Rigidity, Over controlling	

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APPENDIX 2

Publications

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APPENDIX 2.1

Alabart, J.R., **Özgen, S**., Medir, M., Witt, H.J., "*How to Help Senior Chemical Engineering Students Enhance and Develop Leadership Competence*", Proceedings of the Annual Conference, ASEE, Session 1031, June 22-25, 2008, Pittsburgh, Pennsylvania, ISBN: 0-87823-196-X (oral presentation).

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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AC 2008-1031: HOW TO HELP SENIOR CHEMICAL ENGINEERING STUDENTS ENHANCE AND DEVELOP THEIR LEADERSHIP COMPETENCE

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How to Help Senior Chemical Engineering Students Enhance and Develop Their Leadership Competence

Abstract

Chemical engineering students at the University Rovira i Virgili (Tarragona, Spain) have the opportunity to enhance and develop their leadership competence by taking on a team leadership role in a first-year integrated design project. All fourth-year students enrolled for the Project Management in Practice (PMP) course go through a comprehensive team leader selection process. This selection process involves doing three psychometric tests (Belbin, Myers-Briggs, and Leadership Styles) and a competency-based interview with all the PMP's instructors. Finally, a group of about a dozen students are chosen to lead teams formed of first-year students and to manage the design project in which all first-year courses actively participate (hence the adjective of integrated). First-year team member selection is done by team leaders who develop their own selection criteria and take into account first-year students' Belbin roles. The PMP course, like the first-year integrated design project, lasts two consecutive 15-week periods with 4 class hours per week. One hour is reserved for the individual coaching process between a PMP instructor and his/her assigned team leaders. Two more hours are devoted to teaching leadership, project management, and facilitation concepts, techniques, and tools. The remaining class hour is devoted to the weekly formal meeting of leaders with the first-year project team. Hence, there is also a vertical integration between the PMP course and the first-year integrated design project. The assessment of the team leaders' leadership competence is carried out at the individual and team levels. At the individual level, the following processes are in place: (a) a 360-degree feedback process, (b) project management reports (a team charter and a final report per period), oral presentations (one presentation per period), (c) learning journals, (d) behavioral event interviews, and (e) focus groups with team members. Team effectiveness is measured by: (a) a team climate survey, (b) the evaluation of project products (a design report and a poster or an oral presentation followed by a defense), and (c) focus groups with first-year instructors.

Introduction

In 1996, the fourth-year Project Management in Practice (PMP) course was created as an elective in the Chemical Engineering program at the University Rovira i Virgili (Tarragona, Spain). The creation of this course responded to two needs although, actually, one of them was much more compelling than the other. Four instructors teaching three first-year chemical engineering courses - Transport Phenomena, Fluid Mechanics, and Transport Phenomena Laboratory - wanted their students to carry out an integrated design project based on a lactose recovery plant.[1] The integrated design project approach devised by these instructors was based on a combination of project-based and cooperative learning methodologies.[2] First-year students were organized into 23 teams formed of 5-6 members. The challenge for these instructors was how to provide strong leadership to these project teams, as team leadership is one of the key elements to guarantee project teams' success. The allocation of several professors to tutor each team was not practical, given the constraints of limited faculty staff and budget. Then, it was thought that senior students might take on that role. Given that there was a compulsory Project Management course assigned to the fourth year of the program, a new course that enabled fourth-year students to simulate the practice of a project manager was thought to be a great idea. In this way, the idea of project

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teams formed by first-year students and led by a more experienced student, not a course peer, could be put into practice. This asymmetric team setup has eventually proved to be an excellent laboratory to develop personal competences such as leadership.[3]

Leadership development has ultimately come to our attention as a natural evolutionary step in our efforts to improve the effectiveness of PMP students. The education part of the PMP course was initially focused on project management and facilitation skills.[4] However, while this education is necessary, it is not enough to cope with the challenges encountered by fourth-year students with the first-year integrated design project. In addition to the usual changes experienced by all students beginning their university studies,[5] our first-year Ch.E. students find themselves suddenly immersed in a very demanding active learning environment that requires them to change their learning and working habits, sometimes to a dramatic extent.[6] In general, fourth-year students have to deal with first-year students who: (a) show little motivation to study (the minimum grade required to enter our Ch.E. program is low); (b) are willing to do a lot of things at the same time (they do not know how to prioritize or are not prepared to make personal sacrifices); (c) are not used to studying and working at a constant pace and following a plan, (d) are relatively unaccustomed to learning by themselves, either particular contents from the first-year courses or specific skills such as necessary software programs, (e) are unused to depending on others for obtaining a mark; etc. Certainly, it can be said that fourth-year students' main task is to facilitate first-year students' change to new learning and work habits by influencing, motivating and inspiring them, that is, by demonstrating leadership competence.[7]

The purpose of this paper is to describe the system of enabling and assessment processes implemented in the PMP course to facilitate the development and measurement of the leadership competence by fourth-year Ch.E. students. Although the participants in this study are Ch. E. students, what is described can be readily transferred to any other engineering program or any program in general that is based on extensive use of project-based and cooperative learning methodologies.

II. Research question and research method

The number of fourth-year students who take on the team leader role in first-year project teams is very small, about a dozen, which renders experimental designs that require comparisons between groups statistically unviable.[8] Therefore, a case study[9] approach has been adopted to carry out an exhaustive and intensive study of each team leader to answer the following research question: *How do senior engineering students cope with the leadership development challenge that entails performing the team leader role of first-year design project teams?* The case study approach implies the use of a wide range of diverse methods of data collection –participant observation, learning journals, focus groups, etc. - and analysis. Accordingly, appropriate enabling and assessment processes have been implemented in the PMP course and are explained in the following section.

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III. The Project Management in Practice course

The goal of the PMP course is to enable students to experience the demands of a team leader role and to provide them with the appropriate education and coaching support for their personal development.[10] The main figures of the PMP course for the 2007/08 academic year are shown in Table I. It can be seen that only eleven of the students enrolled for the PMP course can actually act as team leaders of first-year project teams and four more students perform that role for project teams formed by peers (eighteen in total).

Table I. The main figures of the PMP course for the 2007/08 academic year.

Indicator	Amount
Number of instructors	4
Number of class hours per week	4
Number of students enrolled	33
Number of first-year project team leaders	11
Number of project teams formed only of PMP students	4

Table II collects the main enabling and assessment processes implemented throughout the PMP course. These processes are sorted out depending on whether they affect only the team leader (individual) or the whole project team (team). All these processes are explained turning the next section of this paper.

Table II. The enabling and assessment processes implemented in the PMP course.

Level	Enabling processes	Assessment processes
Individual (Team Leader)	▪ Team Leader selection. ▪ Education. ▪ Learning journals. ▪ Individual coaching.	▪ Formal meeting observation. ▪ 360-degree feedback. ▪ Behavioral-event interviews*. ▪ Focus groups with team members. ▪ Project management reports. ▪ Oral presentations.
Team (First-year project team)	▪ First-year integrated design project.	▪ Team climate survey. ▪ Project products. ▪ Focus groups with first-year instructors.

* This process is applied temporarily within the framework of a Ph.D. project. For the moment, it is not a regular process of the PMP course.

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III.1 Enabling Processes

First-Year Integrated Design Project

First-year chemical engineering students carry out an integrated design project working in teams. It is an integrated project because all of the first-year courses participate in it. First-year instructors set aside part of their class hours so that teams can work autonomously on their projects, on average five hours a week during two consecutive fifteen-week periods. It is a design project since first-year students have to solve design problems concerning a given manufacturing process. This process has to produce a particular final product, for example nitric acid, or to transform a specific raw material, for example grapes, into different final products. In the latter case each project team must produce a different final product.

First-year students have to define the scope of the project, which is made up of a set of design objectives, taking into consideration the instructional objectives provided by first-year instructors. First-year instructors expect first-year students to learn by themselves part of the content of their courses' syllabuses and apply that knowledge to solve the design objectives. Needless to say, first-year students alone are not able to cope alone with the cognitive and social challenges posed by this project-based cooperative learning experience.

To ensure the success of first-year project teams, some of the fourth-year students enrolled for the PMP course take on the leadership role in the first-year project teams. The PMP course, like the first-year integrated design project, lasts two consecutive fifteen-week periods with four class hours per week. One hour is reserved for the individual coaching process between a PMP instructor and his/her assigned team leaders. Two more hours are devoted to teach leadership, project management, and facilitation concepts, techniques, and tools. The remaining class hour is devoted to the weekly formal meeting of leaders with the first-year project team. Hence, there is also a vertical integration between the PMP course and the first-year integrated project. In addition to the scheduled formal meeting, team leaders meet at least once more with their teams weekly.

Team Leader Selection

The number of leadership positions available is dependent on the number of students enrolled for first year courses. On average, a dozen first-year project teams may be formed. Therefore, approximately only one third of the usual number of students who take the PMP course can actually become first-year project team leaders. The selection of these team leaders is a key process of the PMP course. This process has been designed to select those students who have the highest potential to lead and manage a project team and who are willing to do so. It is structured into three main steps: (1) pre-selection: academic qualification and motivation to be a team leader, (2) screening: personality profile, (3) selection: demonstration of leadership competence. In the first step, all students enrolled for the PMP course have to fill out a short form to check their academic eligibility for the position and their motivation to be a team leader. In the second step, all PMP's students are asked to complete three psychometric tests: Belbin's Team Role Inventory,[11,12] Myers-Briggs Inventory,[13,14] and Leadership Style Inventory.[15] The analysis of the results obtained from steps one and two using a set of research-based criteria yields a list of

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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candidates. Finally, the PMP instructors conduct behavioral-based interviews of all candidates to validate test findings and assess their level of leadership competence to ensure that the best candidates are chosen for the position.

The remaining PMP students form teams to carry out other projects than the first-year integrated project. However, one of these projects, the "Monitoring Team" (MT), is strongly linked to first-year project team leaders. The MT team is formed of eight to twelve PMP students. The goal of this team is twofold. First of all, the MT team assists first-year project team leaders to become more effective in performing their role by providing them with quantitative and qualitative feedback data and by creating tailored training resources. Secondly, it supports PMP instructors by collecting data from first-year students and first-year instructors that facilitates the assessment of the leadership competence level of team leaders. The specific interventions of the MT team are described throughout this paper.

Education

The PMP syllabus has been planned to teach the knowledge, skills, and behaviors required by team leaders to perform properly the leader, team administrator, and facilitator roles that may be needed at any given time while doing the project.[16] Exhibit 1 shows the topics covered during the course, which are taught in the two hours per week that are devoted to education.

Exhibit 1. Contents of the Project Management in Practice course.

Roles	**Topic**
Leader	▪ High impact leadership behaviors: Leadership Competency Dictionary ▪ Listening skills ▪ Giving and receiving constructive feedback ▪ How to provide effective recognition ▪ Selecting a team: Team capabilities ▪ Setting team direction ▪ Team development
Team Administrator	▪ Planning the project: Team Charter ▪ Monitoring the project ▪ Closing-out the project: Final Report ▪ Performance management
Facilitator	▪ Core practices and key behaviors of facilitators ▪ Fostering participation ▪ Effective decision making ▪ Meeting management ▪ Managing conflict ▪ Process tools

Topics are generally covered when students experience the need. On one hand, class scheduling has to be consistent with project and team dynamics. Thus, for example, the "Selecting a team: Team Capabilities" topic must be taught before "Planning the project." On the other hand, other topics such as "Giving and receiving constructive feedback" or "Managing conflict," can be

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programmed with more flexibility. In these instances, the assessment processes and the learning journals help spot the opportunity to introduce any given topic. For instance, it is foreseeable that when the MT team members start observing project team meetings and providing feedback to team leaders, some of these may contradict the feedback received and argue against the MT team members. Then, students are ready to be instructed on the "Giving and receiving constructive feedback" topic.

A Leadership Competency Dictionary has been created to support both this education process and the majority of assessment processes described in subsection III.2. In the first place, this dictionary provides students with a framework of high-impact leadership behaviors. The implicit hypothesis is that the more team leaders show effectively these behaviors, the higher their performance will be as team leaders.[17] Videos and clips from movies are extensively used in class to illustrate leadership and facilitator behaviors. Learning journals are commonly the measure used by PMP's instructors to assess the impact of these learning resources. In the second place, this dictionary is the basis to code all of the written reports, the oral presentations, and to carry out the 360-degree feedback, all of them explained in the assessment process section.

The Leadership Competency Dictionary is in line with other leadership models.[18,19] It is constituted by eight competencies:[20] Commitment to learning, interpersonal communication, drive for excellence, integrity, results orientation, client orientation, responsiveness to change, and teamwork and cooperation. These competencies have been identified by analyzing the Fundamental Concepts of Excellence[21] of the EFQM Excellence Model.[22] Each of these competencies has been defined by the intent of the person applying it and developed according to three proficiency levels. Each level is described in its turn by a definition and five behavioral descriptors. The Exhibit 2 shows part of the integrity competency as an example. The sum of the behavioral descriptors corresponding to the first level of development of the eight competencies gives rise to a forty-statement questionnaire, used for the 360-degree feedback process, which characterizes the first level of leadership: *leadership without position power*. First and second-year students practice this level in their respective design projects. Likewise, the second level of leadership, *team leadership*, is made up by the behavioral descriptors that form the second level of development of the eight competencies. Third and fourth-year students experiment this second level. Finally, the third level of leadership, *transformational leadership*, is reserved for post-graduate students.

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Exhibit 2. Part of the integrity competency from the Leadership Competency Dictionary.

INTEGRITY		
The ability to harmonize honestly words and feelings with thoughts and actions, with the only purpose of doing the good for others, without any evil intent or willingness to cheat, to take advantage of, to manipulate or control them; reviewing constantly his/her own determination and struggling for congruence.		
LEVEL 1 **UPRIGHT** Keeps his/her promises and meets expectations. Personal integrity generates trust.	**LEVEL 2** **COMPASSIONATE CONFRONTATION** Recognizes and confronts faults of integrity in others but within an authentic context of tact, concern, and warmth toward the others.	**LEVEL 3** **SOCIAL RESPONSIBILITY** Makes a genuine effort to balance and meet the expectations of all organization's stakeholders.
▪ Keeps promises made to others. ▪ Expresses what he/she actually thinks and feels even when the message may not be welcome by other people. ▪ …	▪ Is able and willing to confront others as needed. ▪ Admits openly mistakes and faults. ▪ …	▪ Is a role model of the organization's values for the others. ▪ Does not compromise when convinced that something is correct and necessary though unpopular. ▪ …

Learning Journals

Every team leader keeps a learning journal,[23] which is shared only with the PMP's instructor acting as his/her coach. Learning journals are kept electronically in the space reserved for the PMP course in the university virtual campus, being easily accessible to PMP instructors. Students are required to make at least one entry each week. These journals play a pivotal role in team leaders' leadership developmental process since they provide them with:

1. An opportunity to record and reflect on critical work events, either positive or negative. Exhibit 3 contains a few examples of these events as reported by team leaders. This reflection about the action is essential to learn from experience.
2. A means by which PMP's instructors can offer useful feedback and support to team leaders and determine their future development needs
3. An opportunity to practice critical and evaluative thinking with respect to actions and experiences.
4. A means of integrating theoretical learning with workplace leadership practice.
5. A means of "social hygiene" to allow the team leader to vent in a constructive fashion.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Exhibit 3. Examples of critical incidents reported by team leaders.

- A team member wants to quit the project team.
- Lack of project buy-in by team members.
- Comments made by project clients that undermine team leaders' self-esteem.
- Success when giving constructive feedback to team members according to what was explained at PMP classes.
- A team member reproaching the team leader for not knowing the chemical process as well as team members.
- A team leader not doing what he felt was correct to do because he was afraid this would be detrimental to his popularity.
- A new team member that appears to be overbearing towards his team leader.
- Project clients give the Team Charter a low score.
- A team leader is shaken when his team members do not show any sign of excitement when they deliver the final report.
- A team leader is shocked when her team members do not care if they do not achieve all the project objectives.

Although team leaders can make entries to the journal on any and every appropriate occasion, they are encouraged to describe critical work events in particular. Team leaders are trained to explain these critical events by using the following structure, which is used in job competency assessment processes:[20]

1. What was the situation? What events led up to it?
2. Who was involved?
3. What did you think, feel, or want to do in the situation?
4. What did you actually do or say?
5. What was the outcome?

This way, both students and PMP's instructors can better identify habitual patterns of behavior and evaluate them. For this reason, learning journals could also be placed among the individual assessment processes collected in Table II.

At the end of both fifteen-week periods, team leaders are asked to review and evaluate the content of their journals. They are given the following questions to guide them in their reflection:

1. How do I behave and respond in a given workplace situation?
2. Can I identify habitual patterns of behavior/response?
3. Are these helpful or unhelpful behaviors/responses?
4. What leadership strengths are apparent in the behavior patterns?
5. What leadership limitations are apparent in the patterns?

Team leaders write the conclusions of this activity in the final reports for the first and second periods.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Individual Coaching

Each PMP instructor coaches a small group of team leaders, between four and six depending on his/her teaching workload. Coaching is restricted to the behavioral and underlying driver levels, defined by the Center for Creative Leadership[24] and characterized in Table III. The challenge for PMP instructors is to interpret team leaders' behaviors from the perspective of what they reveal about their underlying drivers (preferences, beliefs, etc.) as well as what they mean for performance and leadership capabilities. Exhibit 4 provides an example of coaching at these two levels.

Table III. Levels of coaching and data sources.

Coaching Levels	**Sources**
Behaviors: Observable actions, verbal and nonverbal.	Learning journals and evaluation of formal project team meetings.
Underlying drivers: Personal style, preferences, orientation, culture, aspirations, motivations, mental models, assumptions, values, beliefs, core needs, life experiences (known and understood).	Belbin's roles, Myers-Briggs Types, Leadership Styles Inventory, and Schwartz's Value Survey.

Exhibit 4. Example of coaching at the behavioral and underlying driver levels.

A team leader did a very poor project team launch. His Team Charter got the lowest grade. He wrote on his learning journal that he probably deserved that grade, no objection, but the fact was that he strongly believed that all this planning and team building stuff was useless. He explained that his experience with the second and third-year integrated design projects was that the only things that were really needed to get a good grade in the project were to have motivated peers and good relationships among them. Certainly, although this is true for any team endeavor, it is not enough to achieve optimum team performance. Effective leadership and operating methods must also be in place. However, the context of the second and third-year integrated projects, which is very different from the first-year one, reinforced that belief in that student. An analysis of his personal preferences - shaper (Belbin's role), pacesetter (leadership style), and ESTJ (Myers-Briggs' Type) – revealed that this student was very action oriented and planning was not probably one of his favorite activities.

The PMP instructor meets formally and individually with each team leader for at least twenty minutes each fortnight on Monday's scheduled class. Before this meeting, both the student and the PMP instructor can analyze and interpret individually the student's learning journal and the formal meeting observation feedback provided by the MT team. Then, during the meeting the student and the PMP instructor can discuss critical events and patterns of behavior and relate them to the skills, knowledge, and effective behaviors that are introduced in the education component of the course. In addition to these formal meetings, the team leader can ask his/her assigned instructor to meet whenever the need arises.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Creating a safe and challenging environment in which team leaders can take risks and learn is the responsibility of PMP instructors. However, currently all of them also wear an evaluative hat as they have to eventually grade students. This fact, which is common for any leader, who acts as a coach in any organization,[24] might make team leaders reluctant to take appropriate risks and to get out of their comfort zones. Although the grading system for the course has been designed to mitigate this risk, see subsection III.3, additional feedback from students is needed to evaluate whether the dual role of PMP instructors is representing an obstacle.

III.2 Assessment processes

Table IV displays the assessment processes and when they are executed throughout the PMP course. Except for the formal meeting observation process that takes place weekly, the other processes happen only once or twice all over the PMP course. Therefore, the majority of the assessment processes deployed in the PMP course aim to gauge outcomes, be it the team climate or the leadership competencies actually shown by students.

Table IV. The assessment processes and their implementation throughout the PMP course.

Dimension	Assessment Processes	When are they executed?	By whom?
Individual (Team Leader)	Formal meeting observation.	Weekly. Starting weeks 9 or 10 of the first period.	Monitoring Team (MT)
	360-degree feedback	Twice. Weeks 1 and 14 of the second period.	Project Management in Practice (PMP) instructors
	Behavioral-event interviews	Once. Weeks 10 and 11 of the second period.	Ph.D. student
	Focus groups with team members	Once. Weeks 10 and 11 of the second period.	MT
	Project management reports	Twice. Team Charters: week 6 of the first period and week 3 of the second period. Final Reports: after the completion of each period.	PMP instructors
	Oral presentations	Twice. Once each period is finished.	PMP instructors
Team	Team climate survey	Twice. Week 13 of each period.	MT
	Project deliverables	Twice. Design Report: week 14 of each period. Poster or oral presentation and defense: week 15 of each period.	First-year instructors
	Focus groups with first-year instructors	Once. Week 15 of the second period.	MT

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Formal meeting observation

Members of the MT team observe formal project team meetings weekly and evaluate team leaders' performance. An observation form made up of facilitator's skills and behaviors and meeting and project management items is created by the MT team to facilitate this task.[25] For this reason, formal meeting observation cannot start until weeks 9 or 10 of the first period (see Table IV). Completed observation forms are sent electronically to PMP instructors and team leaders by Friday so they can analyze and interpret this feedback before their coaching meeting held on Mondays.

The fact that team leaders' peers can observe and evaluate these meetings has two advantages: (a) they can provide feedback weekly, helping to spot timely areas of needed improvement, and (b) the tension that any observation process may bring about is eased if this is done by a peer rather than by a PMP instructor.

360-degree feedback process

After the intense experience of a whole fifteen-week period, both team leaders and team members are prepared to participate in a 360-degree feedback process.[26] This process enables team leaders to self-assess the degree to which they demonstrate the set of forty leadership behavioral descriptors that characterize the Team Leadership level of the Leadership Competency Dictionary (see subsection III.1, *education*). At the same time, team members can rate their team leaders against the same set of behavioral descriptors. This assessment process has been completely automated by means of a web-based application. Students can access the application through internet by means of a user name and a password. To ensure that the questionnaire is adequately filled in, all team leaders and team members are convened in a computer lab where PMP instructors can: (a) explain to students the rationale of the process, (b) train them to use the application, and (c) address any concern that may arise. In this gathering, students are reassured about the anonymity and confidentiality of the entire process.

Team leaders receive a Leadership Feedback Report as the product of the 360-degree feedback process. The analysis of this report along with the conclusions collected in the Final Report for the first fifteen-week period (see further on *project management reports*) enable team leaders to create a Personal Development Plan. Team leaders are encouraged to capitalize on the opportunities offered by the first-year integrated project during the second fifteen-week period but also on other experiences that go beyond the limits of the PMP course. Thus, they can take into account future internships, other courses, sport and leisure activities, etc. At the end of the second fifteen-week period, the 360-degree feedback process is executed again. Fourth-year students receive another Leadership Feedback Report which may be used for their self-directed continuing leadership development.[27]

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Behavioral-event interviews

Team leaders undergo a behavioral event interview[20] (BEI) which is conducted by a PMP instructor before the end of the second period. A BEI involves asking students to reconstruct between four and six significant events that they experienced while working with their team and in which they felt particularly effective or ineffective. PMP instructors push to elicit the specific thoughts, behaviors, and actions that students showed in those situations. PMP instructors review the team leaders' learning journals before conducting the BEI to identify potential critical incidents. This way, they can catalyze the interview in case the student gets blocked when trying to think of critical incidents. A typical BEI lasts about one hour and is tape-recorded and transcribed. PMP instructors code the transcripts for all of the leadership competencies of the Leadership Competency Dictionary.

It has to be highlighted that this process overlaps in some way with the learning journal process (see subsection III.1, *learning journals*). BEIs are currently conducted as a part of the Ph.D. project done by one of the authors. It depends on the conclusions of this project whether this process will be kept or removed from the system. For the moment, team leaders are given the transcript of their interview along with their coding and the conclusions drawn once the course is completed.

Focus groups with team members

The MT team is responsible for preparing, planning, and running focus groups with first-year students, one focus group for each project team. The purpose of organizing these focus groups is to get insights into: (a) the work processes and related changes that have taken place within the teams and that can be associated to the PMP course, and (b) the behaviors demonstrated by team leaders and the perspectives and sentiments of first-year students towards them. All focus groups are tape-recorded and transcribed. PMP instructors analyze the transcripts to identify: (a) working team practices and their correlation to team climate and team performance, (b) which leadership competencies have actually been shown by team leaders and their impact on first-year students. All this analyses serve to draw conclusions to improve the education component of the PMP course, the individual coaching process, and the Leadership Competency Dictionary.

It is expected that first-year students will be more unguarded in focus groups that are conducted by students than by PMP instructors, despite the fact that these do not grade first-year students at all.

Project management reports

Team Charters

The first project management report that is required from team leaders is the Team Charter.[28] The importance of this document for managing the first-year design project cannot be understated. The Team Charter embodies the foundations of the team in its forming stage and the planning of the project (see Exhibit 5). It is co-created by the team leader and his/her team

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

members. The power of this document comes from the discussion and agreements that are recorded on it.

Exhibit 5. Content of the Team Charter.

1. The project team
   - 1.1 Roster
   - 1.2 Talent inventory
   - 1.3 Roles description
   - 1.4 Team norms
   - 1.5 Lessons learned and recommendations for improvement
2. Project scope
   - 2.1 Project clients
     - 2.1.1 Clients' needs
     - 2.1.2 Clients' requirements
   - 2.2 Project products
   - 2.3 Project objectives
   - 2.4 Work Breakdown Structure
3. Project schedule (Gantt chart)
4. Meeting management
5. Stakeholders communication strategy
6. Attachments

Team Charters, Final Reports, and oral presentations are all of them coded against some of the competencies of the Leadership Competency Dictionary (see Table V).

Table V. Competencies that are coded for the Team Charter, Final Report, and oral presentations delivered by team leaders.

Element	Competencies Coded	Levels
Team Charter	Commitment to learning	1, 2, and 3
	Drive for excellence	1, 2, and 3
	Results orientation	2 and 3
	Client orientation	1
	Responsiveness to change	2 and 3
	Teamwork and cooperation	2
Final Report	Commitment to learning	1, 2, and 3
	Drive for excellence	1 and 2
	Integrity	1
	Client orientation	1 and 2
	Responsiveness to change	2 and 3
	Teamwork and cooperation	2
Oral Presentation	Interpersonal communication	1, 2, and 3
	Integrity	1
	Commitment to learning	1
	Drive for excellence	1

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Final Reports

At the end of each period, team leaders are required to write a Final Report.[29] To this end, team leaders hold a team meeting to perform a review and evaluation of the period just finished. This review and evaluation is structured in line with the content of the Final Report, which is shown in Exhibit 6. Team leaders hand over the Final Report and deliver an oral presentation to their respective coaches (see Table IV). After the oral presentation, team leaders have the opportunity to receive additional feedback from their coaches on the content of the Final Report.

Exhibit 6. Content of the Final Report.

1. Project Management
   1.1 Project scope
   1.2 Schedule
   1.3 Staff time
   1.4 Additional issues: new members and/or drop outs, conflicts, etc.
   1.5 Lessons learned and recommendations for improvement
2. Evaluation
   2.1 First-year instructors' satisfaction
   2.2 Team performance
   2.3 Individual member performance
   2.4 Team leader performance
   2.5 Lessons learned and recommendations for improvement
3. Strengths and recommendations for improvement for the PMP course and the first-year integrated project
4. Attachments

The first section of the Final Report, project management, deals with the characteristic review issues when managing a project. Thus, project teams must give answer to questions such as: What was really created versus what was planned? Were there deviations from the project scheduling? Why did the deviations occur? Could they have been avoided? etc.

The second section involves a thorough evaluation of the project team at different levels. Firstly, team members, with the help of their team leader, analyze the individual grades and feedback received from first-year instructors. On one hand, all project products - design report, poster or oral presentation, and defense - have been evaluated by first-year instructors and these have already shared their views during the defense. In addition, team leaders have also met with first-year instructors to give and discuss with them their grading of first-year students and to solicit their feedback about the functioning of the different project teams. Secondly, the team analyzes the results of the team climate survey to evaluate team performance. Thirdly, although team leaders carry out individual performance evaluation meetings with their team members, they also share the main results of these individual evaluations with the whole team and first-year instructors. In addition to a grade, team leaders provide team members with a summary of strengths and areas of improvement. The latter will form part of the lessons learned and recommendations for improvement subsection. Fourthly, team leaders must also review and reflect on their own performance. Team leaders are asked to review their learning journals, the

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

feedback received from their coaches throughout the period, and to solicit feedback from their team members (for example through a needs & offers feedback exercise).

Finally, the third section compiles the strengths and recommendations for improvement for the PMP course and the first-year integrated project.

Oral presentations

Once each period is finished, team leaders are required to prepare and deliver a ten-minute oral presentation based on their Final Report. Final Reports are handed over one week before the presentation so that PMP instructors have enough time to grade and code the report. The presentation is followed by a five-minute question-and-answer period. The entire presentation and question-and-answer period are videotaped for later analysis and coding by PMP instructors.

Team climate survey

Team leaders' practices and competencies influence team climate – team climate is what it feels like to work together in a team - more than any other factor.[8] Therefore, team climate is open to improvement as a result of a leadership development process. The analysis of team climate measurements (see Table IV) may help to recognize and understand positive changes in team leaders' leadership competence.

A twenty-two statement questionnaire has been developed to measure the perception of project team members including team leaders. Four of these statements are directly related to the team leader. The reliability of the questionnaire was assessed in terms of the internal consistency using the Cronbach's alpha coefficient. An alpha coefficient of 0.91 was obtained, far exceeding the minimum of 0.70 to be considered reliable.

The team climate survey process is managed completely by the MT team to ensure anonymity to respondents. Team leaders and their coaches receive the results of the team climate survey. Team leaders use these results to engage team members in a discussion to identify ways to improve and PMP instructors may use them in the individual coaching process.

Project deliverables

All teams must deliver a Design Report and present and defend their results to all first-year instructors (see Table IV). The presentation and defense of project results are carried out through either a three-hour long public poster session or a fifteen-minute oral presentation followed by a fifteen-minute question-and-answer period. The defense of project results consists of first-year students being interviewed individually by first-year instructors who assess the degree to which each student has achieved the instructional objectives "lent" to the integrated design project. Team leaders are not allowed to participate directly in the presentation and defense session.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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Focus groups with first-year instructors

The MT team is also responsible for carrying out a focus group with first-year instructors at the end of the second fifteen-week period. Unlike focus groups with first-year students, PMP instructors give support to MT members in running this focus group. The purpose of organizing this focus group is to elicit first-year instructors' thoughts and feelings about the functioning of first-year project teams. A focus group is very convenient in this case because first-year instructors can comment on one another's contributions.

III.3 Grading of the PMP course

As Table VI shows, the grading system of the PMP course is based on the various reports and oral presentations that students have to deliver throughout the course and also a final exam.

Table VI. Grading system for the PMP course.

Element	Weight (%)
Team Charter 1st period	8
Team Charter 2nd period	12
Final Report 1st period	6
Final Report 2nd period	9
Oral presentation plus defense 1st period	12
Oral presentation plus defense 2nd period	18
Personal Development Plan	10
Exam	25

It is critical to emphasize that all deliverables are graded according to the specificity, clarity, and comprehensiveness of the analyses made and their logic, not on to what extent students have demonstrated specific leadership competencies or not. For example, a student may conclude in her Final Report for the first period that she needs to improve her interpersonal communication competency. What is graded by the PMP instructor is the process followed by this student to reach such conclusion. The PMP instructor may agree that that is effectively an area of development for that student; however, this fact does not have a negative effect on the grade. Each PMP instructor grades the written deliverables produced by the team leaders that they coach. Therefore, they are in the best position to check the coherence of what is written by team leaders with the data collected from the learning journal or the formal meeting observation processes, for example.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

IV. Concluding remarks and next steps

A comprehensive system of enabling and assessment processes has been put in place to foster and measure the development of the leadership competence by senior Ch. E. engineering students. A first-year integrated design project creates the appropriate challenging experiences that call on team leaders to move out of their comfort zones. The PMP course provides team leaders with both the support and the assessment that are necessary in order that they can steer their own leadership development. A complete evaluation of the effectiveness of each of the enabling and assessment processes will be carried out in April 2008.

In order to make the system sustainable, it is necessary to have a MT team formed of 8-12 students which is closely monitored by one of the PMP instructors. This team is in charge of carrying out four of the nine assessment processes: formal meeting observation, focus groups with team members, team climate survey, and focus groups with first-year instructors. On one hand, PMP instructors alone cannot execute all the processes. Moreover, students feel more comfortable if they are observed or interviewed by peers than by instructors.

A Leadership Competency Dictionary based on the EFQM Excellence Model has been created. This dictionary provides team leaders with a framework of high-impact leadership behaviors with a clear progression from lower to higher levels of proficiency. Team leaders can reflect on these behaviors, understand their impact, and decide whether to practice them. PMP instructors use the dictionary to code various deliverables generated through the assessment processes together with the learning journals. In addition, team leaders experiment a 360-degree feedback process that has been completely automated by means of a web-based application. The regular application of this 360-degree feedback process with different cohorts of students will enable to refine the dictionary by means of the application of statistical analyses. On the whole, team leaders get used to concepts and methodologies widely employed in organizations and, what is more important, they can improve in those competencies that are most relevant to these organizations.

A Ph.D. project is currently underway to measure the impact of the PMP course on team leaders of first-year design projects. Each team leader is then the subject of a case study, being all the data collected through the enabling and assessment processes analyzed and correlated in order to shed light on the effect of the whole experience on each team leader's leadership development. It is expected to have this project completed by mid 2009.

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UNIVERSITAT ROVIRA I VIRGILI
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APPENDIX 2.2

Alabart, J.R., **Özgen, S**., Medir, M., Witt, H.J., "*Development of the Leadership Competence by Senior Engineering Students Through a Project-Based Learning Experience*", Research Symposium on PBL, Session 1009, June 30-July 1, 2008, Aalborg, Denmark, ISBN: 978-87-991994-5-7 (oral presentation).

UNIVERSITAT ROVIRA I VIRGILI
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Development of the Leadership Competence by Senior Engineering Students Through a Project-Based Learning Experience

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Abstract

Senior chemical engineering students at the University Rovira i Virgili (Tarragona, Spain) have the opportunity to experiment and develop their leadership competence for an academic year. About a dozen students enrolled for the fourth-year Project Management in Practice (PMP) course are chosen as team leaders after going through a comprehensive team leader selection process. These students are responsible to select, build, and lead project teams formed by first-year students that must carry out a first-year integrated design project. The PMP course provides team leaders with the education and support components. Class teaching provides students with the key concepts relevant to leadership. The team and the project create the experiential learning conditions for team leaders to practice their leadership knowledge, skills, and behaviours. Feedback and coaching processes enable leaders to identify their leadership development gaps and to improve their leadership competence.

Keywords: leadership development, project-based learning, engineering students

1. INTRODUCTION

In 1996, the fourth-year Project Management in Practice (PMP) course was created as an elective in the Chemical Engineering program at the University Rovira i Virgili (Tarragona, Spain). The creation of this course responded to two needs although, actually, one of them was much more compelling than the other. Four instructors teaching three first-year chemical engineering courses - Transport Phenomena, Fluid Mechanics, and Transport Phenomena Laboratory - wanted their students to carry out an integrated design project based on a lactose recovery plant [1]. The integrated design project approach devised by these instructors was based on a combination of project-based and cooperative learning methodologies [2]. First-year students were organized into 23 teams formed of 5-6 members. The challenge for these instructors was how to provide strong leadership to these project teams, as team leadership is one of the key elements to guarantee project teams' success. The allocation of several professors to tutor each team was not practical, given the constraints of limited faculty staff and budget. Then, it was thought that senior students might take on that role. Actually, the idea of project teams formed by first-year students and led by a more experienced student has eventually proved to be an excellent laboratory to develop personal competences such as leadership [3].

The education part of the PMP course was initially focused on project management and facilitation skills [4]. While this education is necessary, it is not enough to cope with the challenges encountered by fourth-year students with the first-year integrated design project. In addition to the usual changes experienced by all students beginning their university studies [5], our first-year Ch.E. students find themselves suddenly immersed in a very demanding active learning environment that requires them to change their learning and working habits, sometimes to a dramatic extent [6]. Therefore, fourth year students need to facilitate first-year students' change to new learning and work habits by influencing, motivating and inspiring them, that is, by demonstrating leadership competence [7]. Ultimately, leadership development has come to our attention as a natural evolutionary step in our efforts to improve the effectiveness of PMP students.

The purpose of this paper is to introduce the system of enabling and assessment processes implemented in the PMP course to facilitate the development and measurement of the leadership competence by fourth-year Ch.E. students. Although the participants in this study are Ch. E. students, what is described can be readily transferred to any other engineering program or any program in general that is based on extensive use of project-based and cooperative learning methodologies.

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2. RESEARCH QUESTION AND METHOD

The number of fourth-year students who take on the team leader role in first-year project teams is very small, about a dozen, which renders experimental designs that require comparisons between groups statistically unviable [8]. Therefore, a case study [9] approach has been adopted to carry out an exhaustive and intensive study of each team leader to answer the following research question: *How do senior engineering students cope with the leadership development challenge that entails performing the team leader role of first-year design project teams?* The case study approach implies the use of a wide range of diverse methods of data collection – participant observation, learning journals, focus groups, etc. - and analysis. Accordingly, appropriate enabling and assessment processes have been implemented in the PMP course and are introduced in the following section.

3. THE PROJECT MANAGEMENT IN PRACTICE COURSE

The goal of the PMP course is to enable students to experience the demands of a team leader role and to provide them with the appropriate education and coaching support for their personal development [10]. The PMP course lasts two consecutive fifteen-week periods with four class hours per week. One hour is reserved for the individual coaching process between a PMP instructor and his/her assigned team leaders. Two more hours are devoted to teach leadership, project management, and facilitation concepts, techniques, and tools. The remaining class hour is devoted to the weekly formal meeting of leaders with the first-year project team. Hence, there is a vertical integration between the PMP course and the first-year integrated project. The main figures of the PMP course for the 2007/08 academic year are shown in Table 1.

Indicator	Amount
Number of instructors	4
Number of class hours per week	4
Number of students enrolled	33
Number of first-year project team leaders	11
Number of project teams formed only of PMP students	4

TABLE 1: The main figures of the PMP course for the 2007/08 academic year

Table 2 collects the main enabling and assessment processes implemented throughout the PMP course. These processes are sorted out depending on whether they affect only the team leader (individual) or the whole project team (team). The enabling processes and the 360-degree feedback process are explained in some detail to comprehend the case study illustrated in section 4.

Level	Enabling processes	Assessment processes
Individual (Team Leader)	▪ Team Leader selection. ▪ Education. ▪ Learning journals. ▪ Individual coaching.	▪ Formal meeting observation. ▪ 360-degree feedback. ▪ Behavioural-event interviews. ▪ Focus groups with team members. ▪ Project management reports. ▪ Oral presentations.
Team (First-year project team)	▪ First-year integrated design project.	▪ Team climate survey. ▪ Project products. ▪ Focus groups with first-year instructors.

TABLE 2: The enabling and assessment processes implemented in the PMP course

3.1.1 First-year integrated design project

First-year chemical engineering students carry out an integrated design project working in teams. It is an integrated project because all of the first-year courses participate in it. First-year instructors set aside part of their class hours so that teams can work autonomously on their projects, on average five hours a week during two consecutive fifteen-week periods. It is a design project since first-year students have to solve design problems concerning a given manufacturing process. This process has to produce a particular final product, for example nitric acid, or to transform a specific raw material, for example grapes, into different final products. In the latter case each project team must produce a different final product.

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First-year students have to define the scope of the project, which is made up of a set of design objectives, taking into consideration the instructional objectives provided by first-year instructors. First-year instructors expect first-year students to learn by themselves part of the content of their courses' syllabuses and apply that knowledge to solve the design objectives. Needless to say, first-year students alone are not able to cope alone with the cognitive and social challenges posed by this project-based cooperative learning experience. To ensure the success of first-year project teams, some of the fourth-year students enrolled for the PMP course take on the leadership role in the first-year project teams.

3.1.2 Team leader selection

The number of available leadership positions is limited and only eleven of the students enrolled for the PMP course can actually become leaders of first-year project teams. There is one question that needs to be asked here though: How do we decide which student should take on the leader role? To answer this question a team leader selection process is designed. The premise behind the selection process is to be able to spot the students who are likely to emerge as a leader, to exercise effective leadership, and who are likely to learn and develop it over time. As put by Popper [11]: "*just as the potential of candidates for pilots' courses is examined, there is room to evaluate the potential of candidates for leadership positions*."

The identification of leader potential is also important for the considerations of cost and benefit in terms of time and effort. In other words, this selection enables the identification of students in whom should the leadership development efforts be invested. Because it is harder to build and strengthen the self-efficacy with regard to leadership and it requires the investment of a great deal of time and broad range of experience to do so [11].

In order to identify those students with the highest potential and adequate motivation to lead, a *leader selection process* has been designed. The process is structured into three main steps: (1) pre-selection: academic qualification and motivation to be a team leader, (2) screening: personality profile, (3) selection: demonstration of leadership competence. In the first step, all students enrolled for the PMP course have to fill out a short form to check their academic eligibility for the position and their motivation to be a team leader. In the second step, all PMP's students are asked to complete three psychometric tests: Belbin's Team Role Inventory [12, 13], Myers-Briggs Inventory [14, 15], and Leadership Style Inventory [16]. The analysis of the results obtained from steps one and two using a set of research-based criteria yields a list of candidates. Finally, the PMP instructors conduct behavioural-based interviews of all candidates to validate test findings and assess their level of leadership competence to ensure that the best candidates are chosen for the position. The remaining PMP students form teams to carry out other projects than the first-year integrated project (i.e. designing a cafeteria management system for the university campus) where they can learn and practice leadership without carrying a positional power.

3.1.3 Education

The PMP syllabus has been planned to teach the knowledge, skills, and behaviours required by team leaders to perform properly the leader, team administrator, and facilitator roles that may be needed at any given time while doing the project [17]. Table 3 shows the topics covered during the course, which are taught in the two hours per week that are devoted to education.

Roles	Topic
Leader	▪ High impact leadership behaviours: Leadership Competency Dictionary ▪ Listening skills ▪ Giving and receiving constructive feedback ▪ How to provide effective recognition ▪ Selecting a team: Team capabilities ▪ Setting team direction ▪ Team development
Team Administrator	▪ Planning the project: Team Charter ▪ Monitoring the project ▪ Closing-out the project: Final Report ▪ Performance management
Facilitator	▪ Core practices and key behaviours of facilitators ▪ Fostering participation ▪ Effective decision making ▪ Meeting management ▪ Managing conflict ▪ Process tools

TABLE 3: Contents of the Project Management in Practice course

ISBN:978-84-693-5423-0/DL:T-1414-2010

3.1.4 Learning Journals

Every team leader keeps a learning journal [18] which is shared only with the PMP's instructor acting as his/her coach. Learning journals are kept electronically in the space reserved for the PMP course in the university virtual campus, being easily accessible to PMP instructors. Students are required to make at least one entry each week regarding critical job events [19]. These journals play a pivotal role in team leaders' leadership developmental process since they provide them with:

1. An opportunity to record and reflect on critical work events, either positive or negative. This reflection about the action is essential to learn from experience.
2. A means by which PMP's instructors can offer useful feedback and support to team leaders and determine their future development needs
3. An opportunity to practice critical and evaluative thinking with respect to actions and experiences.
4. A means of integrating theoretical learning with workplace leadership practice.
5. A means of "social hygiene" to allow the team leader to vent in a constructive fashion.

3.1.5 Individual Coaching

Each PMP instructor coaches a small group of team leaders, between four and six depending on his/her teaching workload. Coaching is restricted to the behavioural and underlying driver levels [20] and characterized in Table 4. The challenge for PMP instructors is to interpret team leaders' behaviours from the perspective of what they reveal about their underlying drivers (preferences, beliefs, etc.) as well as what they mean for performance and leadership capabilities.

Coaching Levels	Sources
Behaviours: Observable actions, verbal and nonverbal.	Learning journals and evaluation of formal project team meetings.
Underlying drivers: Personal style, preferences, orientation, culture, aspirations, motivations, mental models, assumptions, values, beliefs, core needs, life experiences (known and understood).	Belbin's roles, Myers-Briggs Types, Leadership Styles Inventory, and Schwartz's Value Survey.

TABLE 4: Levels of coaching and data sources

The PMP instructor meets formally and individually with each team leader for at least twenty minutes each fortnight on Monday's scheduled class. Before this meeting, both the student and the PMP instructor can analyze and interpret individually the student's learning journal and the formal meeting observation feedback provided by the Monitoring Team (see section 3.1.6). Then, during the meeting the student and the PMP instructor can discuss critical events and patterns of behaviour and relate them to the skills, knowledge, and effective behaviours that are introduced in the education component of the course. In addition to these formal meetings, the team leader can ask his/her assigned instructor to meet whenever the need arises.

3.1.6 Formal meeting observation

One of fourth year projects, the "Monitoring Team" (MT), is strongly linked to first-year project team leaders. The members of this team (a total of eight), closely monitored by of one of the PMP instructors, observe the team leaders in their formal team meetings to provide them with quantitative and qualitative feedback data to help them improve their performance. Other than meeting observation, this team also is involved in other assessment process like conducting focus groups with first year students and first year course instructors and collecting data about team climate (Table 2). This monitoring team is highly beneficial for the PMP course. On one hand, PMP instructors alone cannot execute all the processes. On the other hand, students feel more comfortable if they are observed or interviewed by peers than by instructors.

3.1.6 360-degree feedback process

360 degree feedback has been widely used in leadership development [21]. The process of 360^0 feedback is fairly straight forward. It collects both self-ratings of leadership and leadership ratings from "significant others" and feeds back them in terms of a report to the leader [22]. The comparison of self-perception with others' views enables the individual to become more self-aware [23-24] about their behaviours in need of change.

The 360 feedback process is implemented into PMP course after the intense experience of a whole fifteen-week period. To ensure the effective implementation, all team leaders and team members receive training about the rationale of the process and the use of the application. In this gathering, students are reassured about the anonymity and confidentiality of the entire process.

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In the scope of the 360 feedback process, a "Leadership Competency Dictionary" has been created to provide students with a framework of high-impact leadership behaviours and to create the 360 feedback questionnaire. This dictionary is in line with other leadership models [25, 26]. It is constituted by eight competencies [18]: Commitment to learning, interpersonal communication, drive for excellence, integrity, results orientation, client orientation, responsiveness to change, and teamwork and cooperation (see Table 5 as an example). These competencies have been identified by analyzing the Fundamental Concepts of Excellence [27] of the EFQM Excellence Model [28]. The dictionary consists of three proficiency levels;

- 1st Level Leadership without Positional Power
- 2nd Level Team Leadership
- 3rd Level Organizational Leadership

INTEGRITY		
The ability to harmonize honestly words and feelings with thoughts and actions, with the only purpose of doing the good for others, without any evil intent or willingness to cheat, to take advantage of, to manipulate or control them; reviewing constantly his/her own determination and struggling for congruence.		
LEVEL 1 **UPRIGHT** Keeps his/her promises and meets expectations. Personal integrity generates trust.	**LEVEL 2** **COMPASSIONATE CONFRONTATION** Recognizes and confronts faults of integrity in others but within an authentic context of tact, concern, and warmth toward the others.	**LEVEL 3** **SOCIAL RESPONSIBILITY** Makes a genuine effort to balance and meet the expectations of all organization's stakeholders.
▪ Keeps promises made to others. ▪ Expresses what he/she actually thinks and feels even when the message may not be welcome by other people. ▪ …	▪ Is able and willing to confront others as needed. ▪ Admits openly mistakes and faults. ▪ …	▪ Is a role model of the organization's values for the others. ▪ Does not compromise when convinced that something is correct and necessary though unpopular. ▪ …

TABLE 5: Part of the integrity competency from the Leadership Competency Dictionary

Fourth year team leaders exercise the leadership behaviours that characterize the Team Leadership level of the Leadership Competency Dictionary. As such, 360 degree feedback questionnaire involves the set of forty behavioural descriptors that form Team Leadership level. Team leaders self-assess their current leadership competence along those behavioural descriptors. Likewise, team members rate their team leaders against the same set of behavioural descriptors. This assessment process has been completely automated by means of a web-based application (Boonsai®).

Team leaders receive a Leadership Feedback Report as the product of the 360-degree feedback process. The analysis of this report enables team leaders to create a Personal Development Plan. Team leaders are encouraged to capitalize on the opportunities offered by the first-year integrated project during the second fifteen-week period but also on other experiences that go beyond the limits of the PMP course. Thus, they can take into account future internships, other courses, sport and leisure activities, etc. At the end of the second fifteen-week period, the 360-degree feedback process is executed again. Fourth-year students receive another Leadership Feedback Report which may be used for their self-directed continuing leadership development [29].

4. ILLUSTRATING CASE STUDY

Michael (fictitious name) is a twenty-one year old fourth-year student that has been selected to lead a first-year project team. As table 6 shows, he is coordinator as a secondary Belbin's role and authoritative as a secondary leadership style. Both preferences are appropriate, as secondary roles are also considered to be adequate to lead a team and for this reason he passed the selection process. Michael had shown in three previous integrated projects his consciousness, drive to achieve, and initiative.

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Test	Results
Belbin	Plant (primary) and coordinator (secondary)
MBTI®	INTJ
Leadership styles	Pacesetting (primary) and authoritative (secondary)
Schwartz Value	Self-direction
Conflict style	Observant / Introspective

TABLE 6: Michael's profile, a team leader

However, Michael's profile also sowed some doubts to PMP's instructors. Michael has a pacesetting primary leadership style. His leadership style has been found to have a negative impact on his team's climate. Therefore, it has to be used sparingly. It works best when the team is formed by team members who are self-motivated, highly competent and that need little direction or coordination. Generally, this is not the case for first-year project teams. In addition, his Myers-Briggs Type Indicator "INTJ" can be defined in a nutshell as "Competence + Independence = Perfection." Consequently, Michael possesses all the attributes to be an excellent team member, the one everyone turns to when they need help, but could he lead effectively his project team?

Michael's project team is formed by six members. Table 7 collects some relevant data about them. An analysis of their Belbin roles reveals that the team is quite balanced, being all of the required roles present. Apparently, the only risks that Michael may encounter when leading his team are that three members work, and this fact might affect their meetings, and that team member 4 is much older than Michael and is implementer as primary Belbin's role. An implementer (turns ideas into practical actions) may conflict easily with a plant (creative and imaginative).

	Belbin's roles				
Team member	**Primary**	**Secondary**	**Age**	**Does he/she work?**	**Sex**
1	Completer / Finisher	Monitor / Evaluator	18	No	Male
2	Coordinator	Implementer	20	Yes	Female
3	Shaper	Resource investigator	18	No	Male
4	Implementer	Monitor / Evaluator	32	Yes	Male
5	Teamworker	Resource investigator	20	No	Male
6	Plant	Resource investigator	20	Yes	Male

TABLE 7: Some relevant data on Michael's team members

Michael started writing his learning journal on October 18th 2007. Since then and every two Mondays, he and his coach have met to discuss the content of his journal. In his first entry to the journal, Michael describes an apparently trifling incident. While team members were discussing about the project's planning and the process diagram, one of them used the word alembic. Michael asked what was that and the team members retorted that he, as the team leader, must know the chemical process as well as they knew it. This is a recurring topic in Michael's journal, in one way or another he receives feedback from his team members that he is an *incompetent* leader. Team members are resentful with him because they think that with his knowledge he could guide them better. Team leaders know that they cannot act as private teachers. This is clearly stated in their role's description. However, they can, and are trained for that, facilitate team members' learning through questioning. For this reason, team leaders are encouraged to carry out project activities by themselves to be able to anticipate potential difficulties and craft both appropriate working methods and questions. In spite of the feedback received by his coach, Michael did not do too much to change his working habits. According to Daniel Goleman, one of the characteristics of the pacesetting leadership style is: "Guidelines for working may be clear in the leader's head, but she does not state them clearly; she expects people to know what to do and even thinks, 'If I have to tell you, you're the wrong person for the job.'" Michael's coach was wondering whether this was the underlying reason why Michael behaved that way.

In addition, the feedback obtained through other assessment processes corroborated that the *incompetent* leader was a key issue. The team's climate survey results for the first semester showed that team members rated moderately low the statement: "I trust fully my team leader." A team member wrote straightforwardly in the blank space provided in the survey: "Lack of knowledge by the team leader on the project." After receiving the Feedback Report produced by the 360-degree feedback process, Michael identified clearly that "*Poses insightful and challenging questions to facilitate understanding and learning*" was a key area of improvement. Observers from the MT also pinpointed this as an area of improvement: "*During the meeting, the team leader makes open*

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questions to team members in order to check their learning although these questions should be more insightful and probing."

Another recurring topic in Michael's journal is that team members feel that he is an *uncaring* leader. Michael writes in his journal: "I turn out to be a result-oriented leader that shows no concern about the feelings of my team members when actually I care about them but I keep it to myself." However, Michael writes on his journal several times that he tells his team members: "But this is *your* project…," verbalizing his detachment from the project and, eventually, from them. Unwittingly, Michael's body language is also sending continuously negative signals to his team members. For example, observers from the MT point out that Michael continuously touches his face and one of his ears with his hand during the formal meetings. Both gestures must generate distrust to team members. Overall, Michael's journal is spotted of interpersonal interactions that usually trigger to him negative feelings such as frustration and resentment.

The case study presented here demonstrates that the enabling and assessment processes implemented throughout the PMP course clearly help both course instructors and the leader students to pinpoint their key strengths and areas of improvement in relation to high-impact leadership behaviours.

5. CONCLUDING REMARKS AND NEXT STEPS

A comprehensive system of enabling and assessment processes has been put in place to foster and measure the development of the leadership competence by senior Ch. E. engineering students. A first-year integrated design project creates the appropriate challenging experiences that call on team leaders to move out of their comfort zones. The PMP course provides team leaders with both the support and the assessment that are necessary in order that they can steer their own leadership development. A complete evaluation of the effectiveness of each of the enabling and assessment processes will be carried out in April 2008.

A Leadership Competency Dictionary based on the EFQM Excellence Model has been created. This dictionary provides team leaders with a framework of high-impact leadership behaviours with a clear progression from lower to higher levels of proficiency. Team leaders can reflect on these behaviours, understand their impact, and decide whether to practice them. PMP instructors use the dictionary to code various deliverables generated through the assessment processes together with the learning journals. In addition, team leaders experiment a 360-degree feedback process that has been completely automated by means of a web-based application. The regular application of this 360-degree feedback process with different cohorts of students will enable to refine the dictionary by means of the application of statistical analyses. On the whole, team leaders get used to concepts and methodologies widely employed in organizations and, what is more important, they can improve in those competencies that are most relevant to these organizations.

A Ph.D. project is currently underway to measure the impact of the PMP course on team leaders of first-year design projects. Each team leader is then the subject of a case study, being all the data collected through the enabling and assessment processes analyzed and correlated in order to shed light on the effect of the whole experience on each team leader's leadership development. It is expected to have this project completed by mid 2009.

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APPENDIX 2.3

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AC 2008-1552: A TEAM LEADER SELECTION PROCESS FOR PROJECT-BASED LEARNING EXPERIENCES

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A Team Leader Selection Process for Project-Based Learning Experiences

Abstract

First-year chemical engineering students at the University Rovira i Virgili (Tarragona, Spain) carry out an integrated design project organized in teams. This project lasts two successive fifteen-week periods and all of the first-year courses participate actively in it, hence the adjective integrated. The goal of this project is that first-year students learn by themselves certain contents of each first-year course and that they apply this knowledge to solve several design problems that may be posed when designing a specific chemical plant. Project teams must also identify and define these design problems taking into account first-year instructors' requirements. To help first-year project teams cope with this challenging experience, project teams are led and managed by fourth-year students who are enrolled in the fourth-year Project Management in Practice (PMP) course. Leadership is a key component for the success of any team and consequently the selection of first-year project team leaders is a key process of the PMP course. The selection process has been designed to select about a dozen students, which represents about one third of PMP's students, who have the highest potential to lead and manage a project team and who are willing to do so. The selection process is structured in three main steps: (1) *pre-selection*: academic qualification and motivation to be a leader, (2) *screening*: personality profile, (3) *selection*: demonstration of the leadership competence. In the first step, all students enrolled in the PMP course have to fill out a short form to check their academic eligibility for the position and their motivation to be a leader. In the second step, all PMP's students are asked to complete three psychometric tests: Belbin's Team Role Inventory, Myers-Briggs Inventory, and Leadership Style Inventory. The analysis of the results obtained from steps one and two using a set of research-based criteria yields a list of candidates. Finally, PMP's instructors conduct behaviour-based interviews to all candidates to validate test findings and assess their level of leadership competence to ensure that the best candidates are chosen for the position.

1. Introduction

The School of Chemical Engineering at the University of Rovira I Virgili (Tarragona, Spain) deploys an Integrated Design Project (IDP) approach in which first and fourth year courses are horizontally and vertically integrated[1]. This 1^{st}-4^{th} year IDP approach integrates all first year courses horizontally into a design project by which first year students are teamed up and challenged to design a specific chemical plant or product by applying the theoretical knowledge from first-year courses. First-year teams work during two consecutive fifteen-week periods towards the development and accomplishment of the design project consistent with the requirements of clients; first-year course instructors.

To help first year students manage this challenging project, part of the fourth year students who are enrolled to Project Management in Practice (PMP) course are selected to take on the leader role of first-year project teams. PMP course, offered annually, places premium on the development of leadership competence of fourth-year

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engineering students. In this context, selection of team leaders was of prime importance to both first year project teams and to PMP course itself.

Speaking in terms of first-year teams, the role of the student leader is undoubtedly very important. A large and growing body of research considers leadership as one of the key determinants of team effectiveness and team success[2-4] due to the important role the leader plays in target setting, steering the group dynamics in the right direction[5], resolving conflicts and keeping the team on track[6] and facilitating team process[7]. It has been further argued that leadership should be considered as the *most important factor* affecting team effectiveness[8]. With that being said, one may comprehend how effective and healthy functioning of first-year teams might be jeopardized by a fourth year leader's failure in leading the team.

Another reason why the leader role is considered to be important in the 1st-4th year project is the potential impact of the leader on first year students' development. Previous studies have reported that leadership impacts the development of followers[9, 10]; therefore first year students' development might be affected by the fourth-year leader students. Needless to say one other important role of the fourth-year leader is to role model the system. From a vicarious learning perspective, defined as learning based on observation of others' behavior[10], it is probable that first year students imitate their leaders and start to behave like them. This point emphasizes that a fourth-year leader student may have an effect in shaping the development of future leaders'; first year students.

The decision of which student should become the team leader is equally important for the dynamics of the PMP course also. Leader development is a focal point in PMP course and one clear implication is the need to identify those students who have a potential to take the leader role and learn it over time.

For the above mentioned reasons designating a student as the team leader is not easy and definitely should not be done in a haphazard manner. This paper presents a methodical selection process for the concise identification of students' leadership potential. The paper first gives a brief overview of the PMP course and continues with the theoretical frame on which the leader selection process is based. The last section explains how this selection process is implemented into PMP course in 2007-2008 academic year.

2. Project Management in Practice Course (PMP):

Project Management in Practice (PMP) has been designed and presented as an elective course aimed at enhancing fourth-year students' competence in leadership and skills in project management and facilitation. In this course students may become the *leaders* of first-year project-teams. Number of leadership positions in PMP course is limited and generally only one third of the PMP students can actually take on the leader role. The students who want to become the leader have to undergo a selection process before they are eligible to lead first-year project teams. Through the selection process explained in this paper, the students with the highest potential and adequate desire to lead are identified and selected as the leaders. The remaining of the students, who are not willing to become a leader and who are not selected as leaders, participate in various fourth year project teams. In those teams, students might choose to work in one of pre-determined

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projects (i.e. developing a competency-based evaluation methodology for other departments) or they might as well propose project (i.e. designing a cafeteria management system for the university campus).

The selected leaders help first-year students to solve design problems concerning a given manufacturing process. This process has to produce a particular final product, for example nitric acid, or to transform a specific raw material, for example grapes, into different final products. In the latter case each project team must produce a different final product. The responsibilities of the team leader involve leading change, building the team and managing the project. Table 1 summarizes the role of the first-year team leader and the duties and responsibilities associated with that role.

Table 1: The role of a first-year team leader and the associated responsibilities, and duties

Description of Role: Team Leader will be responsible for the development of teams which effectively meet needs, achieve goals and manage the way in which they work. The Team Leader, leading primarily from a position of power, will act as a role model to teams, helping them to build relationships, adopt methodologies and gain the knowledge and skills needed to accept greater levels of responsibility over time and increase performance.	
Responsibilities	
Leads Change	○ Sees and explains the big picture. ○ Defines a purpose for the team, envisions future success (goals, targets) and a path to follow. ○ Motivates and inspires team members and becomes a role model for leadership and teamwork. ○ Handles fear to change of members.
Builds the Team	○ Investigates the capacities of the team and its individual members and encourages them to improve continuously. ○ Is responsible for the team charter (clients, stakeholders' needs and requirements, team norms, project scope, time schedule, product definition, communication processes, etc.).
Manages the Project	○ Monitors process execution and manages changes in the planning. ○ Assesses team members to improve performance (gives continuous feedback and quantitative performance appraisal to team members, applies balance of consequences). ○ Handles conflicts and facilitates constructive conflict resolution. ○ Manages meetings and coordinates activities. ○ Is responsible for the close-out report.

To help leader students acquire and develop leadership competence, PMP course provides students with the formal training, experiential learning (being the leader of first-year teams) and coaching processes that are relevant and central in leadership development. Formal training, done through in-class teaching, equips students with the key concepts relevant to leadership, project management, and facilitation techniques and tools (2 hours/week). Formal meetings with first-year teams (1 hour/week) enable students to experience and apply those concepts that are thought in the class. Each leader student is formally and individually coached at least twenty minutes.

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3. Theoretical Model

3.1. Background Information

This section presents the underlying theory on which the *leadership selection process* is based. Recent research regarding leadership development has heightened the importance of evaluating the potential of candidates for leadership positions[10]. This evaluation is required to spot people who will succeed in a leadership role. In order to make such prediction, however, it is essential to identify key dimensions associated with leadership effectiveness; in turn the leadership potential. So far, however, no single dimension has been reported as to be making the sole contribution to leadership potential. Various dimensions have been suggested by different researchers as to be predictive of leadership success. Our review of relevant literature identified the following dimensions as being *highly* related to leadership potential:

- motivation to lead,
- personality preference, and
- leadership competence

The above mentioned dimensions therefore constitute the basis for the construction of the leader selection process presented in the paper. The following paragraphs present the importance of including aforesaid dimensions in the evaluation process of leadership potential.

- *Motivation to lead*: Motivation to lead is defined as "*a construct that affects a leader-to-be's decision to assume leadership roles and responsibilities and that affect his or her intensity of effort at leading and persistence as a leader*"[11]. This dimension is particularly important in identification of leadership potential because an individual would not become a leader without this motivation[10, 12]. For a fourth-year student leader to succeed, it is important that he or she be ready to take on this responsibility and has the adequate motivation to do so. If the fourth year student is not willing to become a leader, the leadership training and experience provided in the PMP course would be unworthy as these students will not practice them. Therefore selection should relate to the question of motivation.

- *Personality Preferences*: The issue of personality has been an intriguing subject in the field of leadership for some time now. A substantial body of research has been devoted to identify the possible linkages between personality and leadership[12, 13-17] Evidence from these studies demonstrated that personality variable can be used to determine who is likely to emerge as a leader, exercise effective leadership[13-14], to learn and develop it over time[12]. Just as there are personality preferences associated with effective leadership, there are also other individual differences and qualities that may cause failure in leading[18]. Also there are personality types that tend to avoid leadership roles and may experience considerable discomfort when forced into such roles[19]. Therefore, personality type should be strongly considered when selecting a team leader[6]. Personality identification not only allows PMP course instructors to identify the candidates who possess adequate personality dispositions as required by the leader role but also it helps us to position the students to the roles that they would feel themselves most comfortable with. In doing so, any negative outcomes consequent to student misplacement would be prevented.

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- *Leadership Competence:* Leadership is a competence cluster and contain several competences that when applied appropriately result in desired outcomes in relation to leadership. Based on the Fundamental Concepts of Excellence of the EFQM Excellence Model[20] eight competences have been identified to be related to effective leadership: integrity, initiative, drive for excellence, responsiveness to change, commitment for learning, teamwork, service, and interpersonal communication.

In addition to the dimensions stated above, *academical eligibility* has been also considered as relevant for fourth-year students' effectiveness in leadership. Since the design project involves the application of the theoretical concepts from first-year courses, a fourth-year student who failed first year courses may not be able to guide the teams in an effective manner. It has been also considered that a leader with pending courses from first-year may not also seem so trustworthy to first-year students. Therefore, a fourth dimension, academical eligibility, has been included as relevant for evaluating fourth-year students' leadership potential.

Consequently, it was decided to look for the demonstration of academical eligibility, motivation to lead, personality preference, and leadership competence when choosing the team leader. This multi-facet approach for the leader selection covers the relevant dimensions deemed important for the leadership potential which in turn allows the identification of leadership potential in a concise, clear and objective manner. Therefore this selection ensures that;

- The first-year project teams are lead by those students who have the *highest potential* to do so. It eliminates any possible criticism of choosing the leaders depending solely on one factor like their academical achievement, personality, or such.
- The return on leadership development investment would be high for the PMP course. In other words, this selection identifies the students in whom should the leadership development efforts be invested. Because it is harder to build and strengthen the leadership in those individuals who lack that potential, it requires the investment of a great deal of time and experience to do so.
- The students are placed into the roles that they would feel themselves most comfortable in assuming and fulfilling.

That being said, it is now necessary to explain how aforesaid dimensions are measured throughout the selection process. The following section provides an understanding of the application of instruments and techniques in identifying each one of the dimensions.

3.2. Measuring Leadership Potential

Academical Eligibility: The necessary condition for being academically eligible is that the fourth year student should have approved all the first-year courses. Since academical

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achievement records are considered as confidential information, it was not possible to reach this sort of information by obtaining record of achievement from the student affairs department. Therefore, it was decided to ask students directly if they have approved the first-year courses through the use of a survey.

Motivation to Lead: Though there are several types of surveys used for the investigation of the construct of motivation to lead, it was not our intent to identify the underlying constructs of motivation. It was our concern if the students would like to take on the leader role of first-year project teams. For this reason it was decided to ask students one very concrete question "*Would you like to become one of the leaders of first-year teams*?"

Leadership Competence: The interview method of assessing competencies has been widely accepted[21]. *Behavioral Event Interviews (BEI)* technique was chosen as a technique to assess students' level of leadership competence. The basic principle of competency approach is that what people think or say about their motives or skills is not credible. Only what they actually do, in the most critical incidents they have faced, is to be believed[22]. Therefore, the objective of BEI is to get very detailed behavioral descriptions of how a person goes about doing his/her work[22]. The questions are based on real situations and the interviewee is asked to describe the specific behaviors, thoughts, and actions s/he has shown in real critical situations. An example BEI question is; "Describe a time when, against all odd, you were able to get a project or task completed within the defined parameters."[23]

Personality Preferences: Psychometric tests have been found to be valid predictors for performance and it has been stated that failure to employ them in selection lead to economical losses[24]. To identify the individuals who possess sufficient personality traits salient to leadership three psychometric tests have been administered to the students who are enrolled to the PMP course: *Myers-Briggs Inventory, Belbin's Team Role Inventory, Leadership Style Inventory*. The next section provides a theoretical understanding of the psychometric tests that are used to determine the personality preferences of a leader.

3.3 Psychometric Tests

This section provides an understanding of the theoretical and research history behind the psychometric tests being used in the identification of leader-linked personality preferences.

3.3.1 Myers-Brigs Type Inventory (MBTI)

Myers-Briggs Type Inventory (MBTI) is credited as being the world's best-known and most widely used personality inventory[25] and has been found to be useful in identifying leadership styles[26]. Based on Jung's work, MBTI assesses personality types and preferences in terms of four scales with two opposing preferences in each scale;

Focus of Attention:

- *Extrovert (E)*: Energized by interacting with others and taking action, thinks out loud, are sociable and expressive.
- *Introvert (I):* Draw energy and renewal from time alone, thinks best when alone, can be seen as private and contained.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Information Take-in:

- *Sensing (S):* Focus on present realities, prefer the factual and concrete, takes in discrete information at a time.
- iNtuitive *(N):* Focus on future possibilities, imaginative and creative, takes in great, undifferentiated chunks of information.

Decision Making:

- *Thinking (T):* Analytical, use cause and effect reasoning, solves problem with logic, use their heads.
- *Feeling (F):* Empathetic, are guided by personal values, strive for harmony, use their hearths.

Relationship with the Outer World:

- *Judging (J):* Tend to act decisively, to emphasize planning, time frames, and task completion.
- *Perceiving (P):* Flexible, spontaneous, and enthusiastic. Prefers the open-ended.

The combinations of the four types produce 16 different personality types. An individual typed as an ISTJ, for example, would exhibit preferences for introversion, sensing, thinking and judging.

It is worth to note that different types are attracted by different careers[27]. For example, ESTJ is a predominant preference in managerial roles[19]. Our attention was drawn to high percentage of TJs (85%) in top-level executives and it was asserted that "a preference for T alone is not enough it needs to be *extraverted thinking* for progression in organizational ladder"[28]. Furthermore, it was argued that life's natural administrators are the *ESTJ*s while life's natural leaders are the *ENTJ*s[29]. In a similar vein, ESTJ has been proposed as a preference for leaders[30]. Drawing on these sources; ESTJ and ENTJ have been selected as personality-type preferences to be looked in candidates. Table 2 presents the descriptions of these two MBTI personality types.

Table 2: Brief description of ESTJ and ENTJ personality types[31]

	ESTJ	**ENTJ**
Definition	Practical, realistic, matter-of-fact. Decisive, quickly move to implement decisions. Organize projects and people to get things done, focus on getting results in the most efficient way possible. Take care of routine details. Have a clear set of logical standards, systematically follow them and want others to do so. Forceful in implementing their plans.	Frank, decisive, assume *leadership* readily. Quickly see illogical and inefficient procedures and policies, develop and implement comprehensive systems to solve organizational problems. Enjoy long-term planning and goal setting. Usually well-informed, well-read, enjoy expanding their knowledge and passing it onto others. Forceful in presenting their ideas.
Workplace Contribution	Drives to take charge, to see the practical facilitation of a task, and to complete it with dispatch and skill.	Through, hard-charging arguments and action, intellectually inspires and challenges everyone to experience a vision and to move toward its fulfillment and dispatch.
Leadership Qualities	Takes charge, demands loyalty, pushes hard to accomplish a task and tells it like	Is task-driven and demanding, with a motivational spin for everyone to get on

ISBN:978-84-693-5423-0/DL:T-1414-2010

	it is.	board and move toward challenging the goal.
Suggested Project Management Jobs	Practical team manager, quick answer problem-solving, role management, execution manager.	Intuitive team leader, intellectual leader, task driven manager

In this study Spanish version of MBTI (Form G) is used[40]. MBTI is a forced-choice, self-report questionnaire.

3.3.2 Belbin's Team Role Inventory

Belbin in 1981 introduced the concept of "team role" and since its introduction the theory has been used for counseling, development, team performance[32-37]. Belbin's team role was based on 9 years observations with teams of middle managers taking part in General Management Course at Henley Management College. Participants of the study were assessed by using a multi-method technique (combining personality tests, critical thinking inventories, and observational methods) and following these efforts different clusters of behaviors were identified; "*team roles*". Team role has been defined as "*a tendency to behave, contribute and interrelate with others at work in certain distinctive ways*"[38].

Belbin maintained that not only do team roles exist as behaviors and thinking styles but individuals will tend to have distinctive preferences or "natural" roles which will be assumed in most occasions. Accordingly, Belbin defined eight roles and coined them as; Chairman, Shaper, Plant, Monitor-Evaluator, Resource Investigator, Team Worker, Company Worker, Completer-Finisher[38].

Among these eight team roles Coordinator and Shaper appear as the two distinctive leader types. Coordinator is the mature and confident guiding and controlling leader who organizes and controls the activities of the team, clarifies goals, promotes decision making. Coordinator takes the maximal advantage of team's human resources. On the other side of the spectrum, Shaper is the challenging, dynamic confrontational leader who pushes the members to excel obstacles. Shaper questions opinions and decisions and makes members take extra effort in their work. Therefore, Shaper and Coordinator roles have been inferred as the preferential team roles for a fourth-year team leader.

Students' team roles were determined using the printed version of Self-Perception Inventory[38].The test consists of seven sections; for each section the individual distributes 10 points among 8 statements, based on how strongly they feel about each statement.

3.3.3 Leadership-Style Inventory:

Consulting firm Hay/McBer's research, drawn on 3,781 executives, identified six different types of leadership styles (Table 3).

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 3: Descriptions of the six leadership styles[39]

	Coercive	Authoritative	Affilitative	Democratic	Pacesetting	Coaching
When appropriate	In crisis or to start a turnaround	When change requires new vision or to provide clear direction	To motivate people in stress or to heal team conflicts	To build consensus or get employee input	To get quick results from a motivated and competent team	To help improve performance or develop strengths in employees
Objective	Demand immediate compliance	Mobilizes people toward a vision	Creates harmony	Forges consensus through participation	Sets high standards for performance	Develops people for the future
Impact on climate	Strongly negative	Most strongly positive	Highly positive	Highly positive	Highly positive	Highly positive

Admittedly, each of the six leadership styles is necessary for a skilled leader and should be applied interchangeably depending on the requirements of the situation. Considering the responsibilities of a fourth-year leader and the requirements of the position, *Authorative* and *Coaching* styles have been selected as the most preferable leadership styles for fourth-year student leaders.

As mentioned before, one important responsibility awaiting the leader of a first-year project team is to create a vision for the future (Table 1). Authorative (sometimes called the "visionary") leader provides a clear vision that motivates the followers to be creative in the pursuit of goals and objectives. This type of leaders often acts as agents of change and generates the most positive climate (Table 3).

An equally important responsibility for a fourth-year team leader is to develop first-year students in terms of improving their capacities and abilities. Coaching leader is skilled at identifying and building on the potential of followers. Focusing on the personal development this style enables followers to cope with challenges, experiment with new ideas, and accept responsibility for failure.

The Hay Group Inventory of Managerial Style[41] (Spanish version) was utilized for the determination of students' leadership styles

Based on the inferences from these psychometric tests, it has been decided that a potential candidate need to possess at least one the leader-linked personality preferences identified as by the tests as;

- ESTJ or ENTJ (MBTI)
- Shaper and/or Coordinator (Belbin's Team Role)
- Authorative and/or Coach (Leadership Style)

Combining a leader's suggested personality preference with the other determinants of leader potential (academical eligibility, motivation to lead, and leadership competence) a profile for a potential and ideal team leader is created (Table 4).

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 4: The profile for a potential leader candidate for the first-year project teams

Academical Eligibility	Motivation to Lead	Personality			Leadership Competence
		MBTI	Belbin's Team Role	Leadership Style	
√	√	ESTJ *or* ENTJ	Shaper *and/or* Coordinator	Authorative *and/or* Coaching	√

4. Leader Selection Process

The leader selection is based on the theoretical frame given above and is a three-step process (Figure 1) and this section provides information about how the *leader selection process* is implemented in PMP course in 2007-2008 academic year.

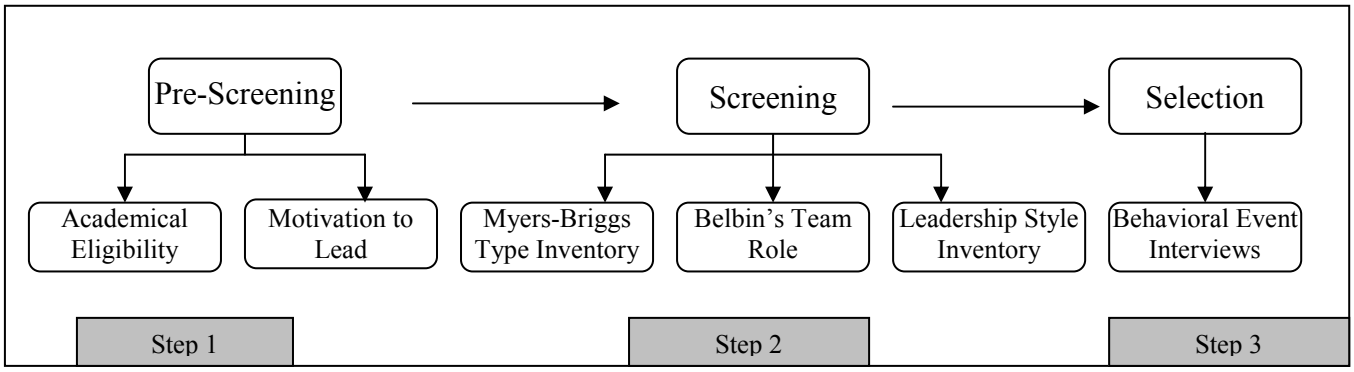

Figure 1: Schematic diagram of the steps in leader selection

A total of 33 students were enrolled to PMP course. First day of the course was dedicated to informing the students about PMP course dynamics with more emphasis given to the theme of participation in project teams. Students were acknowledged that in the continuum of the course they would be participating either as leaders in 1^{st}-4^{th} year integrated projects or as team members in 4^{th} year project teams. The descriptions and responsibilities of both roles (team leader and team member) were explained to the students. Students were acknowledged they may become a leader of first-year teams with the understanding that they have to undergo a selection process. Depending on the number of the students who were enrolled to first year courses (n=59) the number of available places for leadership position for first year project teams has been announced as 11 (one third of the students in PMP course).

The selection process took place in the beginning of the academic year. The first step, distribution and collection of the short form, was carried out in the first week of the academic year. The second step involves the application of psychometric testing. In this step, students were instructed about the nature and underlying theory of each one of three psychometric tests. The students were acknowledged that there were no right or wrong personality preferences and that these personality preferences would be helpful in positioning them to roles that they would be feeling most comfortable with. It was also emphasized that results from these tests would enable them to become aware of their individual differences and preferences which would help them to recognize and comprehend each others roles and contribution to the team. During a two-week-period (after the first step) three psychometric tests have been administered to all of the

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students in the PMP course. The results from step 1 and step 2 yielded a list of candidates. These candidates were invited to the final step in the selection process; behavioral event interviews (BEI). BEI's were conducted by the PMP tutors. Each candidate was interviewed for 15-20 minutes to verify leadership competence.

First Step: Selection

The first step in the selection process identifies the students with the adequate academical eligibility and motivation to become a leader of first-year project teams. The results from the initial survey demonstrated that more than half of the PMP course students (N=18) met the academical requirement to become one of the team leaders. However, contrary to our expectations not all students with academical eligibility were willing to take on the leader role (Table 5). Half of the students with academical eligibility (N=9) did not want to be a leader of the first-year project teams.

Table 5: The relationship between students' academical eligibility and motivation to lead

		Motivation		Total
		Yes	No	
Academic Requirement	Yes	9	9	18
	No	2	13	15
Total		11	22	33

Generally those students stated their concern with the time requirement for the project. They were not sure if they could manage to find sufficient time to dedicate on the project. Not to deny, being a team leader involves some certain responsibilities and costs. It may be possible that no-desire-to lead students were *calculative*[11] about the costs and responsibilities of leading a first-year team relative to its benefits. Consequently those students might have shirked leadership role to avoid the costs and responsibilities linked to it. This is one assumption and of course there could be many other factors affecting students' motivation to become a leader (i.e. past leadership experience, values and personality). However, it is not the intent of this paper to discuss in detail the reasons why the students did (not) want to lead first-year project teams. Key to our approach was the identification of students' with the motivation to lead a first-year project team. As noted earlier, without motivation a student would not be successful in leading a team. Therefore, the students who did not wish to lead the teams (N=22) were not considered as candidates for the leadership position and were placed in one of the 4th year project teams depending on their preferences.

At the end of first step, a total of eleven students have been identified as having the motivation to participate in leadership role with two of them not meeting the academic requirements. At this point we were confronted with the problem of not having enough number of students with both academical requirements and motivation. As mentioned before, the required number of students for the leader position was eleven and we had nine after the first step of the selection process. It was the decision if to include the other two students; the ones who wish to become leaders but do not meet the academic requirements. It was agreed upon to involve these students in the second step on condition that students don't have more than one course pending from first-year. The two students have claimed that they have only one first-year course to approve.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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Therefore, first step yielded eleven students as potential candidates. Following this step was the analysis of personality profiles.

Second Step: Psychometric Testing

The second step intents to identify if the candidates possess adequate personality preferences salient to leadership. For this reason, students' preferences, derived from previously mentioned three psychometric tests, are compared with the ones of a leader (see Table 4).

Personality profile analysis of PMP class revealed that 81.82% of the PMP students display personality preferences in relation to leadership with 51.2% of the students demonstrating at least one personality type preference related to leadership (Figure 2).

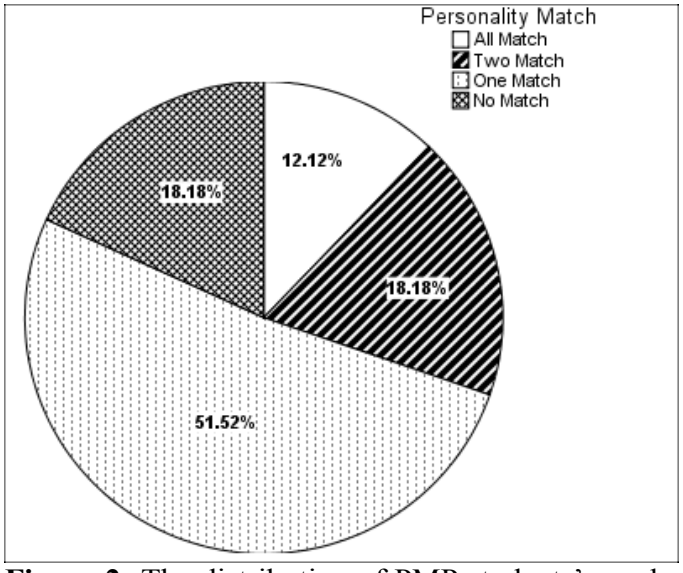

Figure 2: The distribution of PMP students' number of personality preference matches with the leader-linked preferences

Only 18.18% of the students did not demonstrate any of the three personality preferences. It was interesting to find out that, students who do not possess leader-type preferences did not want to become leaders either (Table 6). Yet there were some students who demonstrate adequate preferences to be a leader but not willing to become one.

Table 6: The relationship between students' personality match with leadership and motivation to lead

		Personality Match			
		No Match	One Match	Two Match	All Match
Motivation to Lead	No	6	10	3	3
	Yes	0	7	3	1

The profiles of potential candidates from Step 1 (N=11) is presented in Table 7. This table demonstrates the match between students' preferences with the ones of a leader. As clearly can be seen from the table, each student has a profile which exhibits at least

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one personality preference match. In this respect, these eleven students fulfilled the necessary conditions to be announced as candidates for leader position hence to proceed to the third and final step of leader selection process; behavioral event interviewing.

Table 7: The personality profiles of potential candidates

Leader Coding	Belbin's Role		Leadership Style		MBTI
	Primary	Secondary	Primary	Secondary	
L1	Shaper	Coordinator	-	-	ESTJ
L2	Shaper	Coordinator	-	-	-
L3	Shaper	-	Authorative	-	ESTJ
L4	Shaper	-	Authorative	-	-
L5	Shaper	-	-	Authorative/ Coercive	-
L6	Shaper	-	-	-	-
L7	-	Coordinator	-	-	ESTJ
L8	-	Coordinator	-	Authoritative	-
L9	-	-	-	Authorative	-
L10	-	-	-	Coach	-
L11	-	Shaper/ Resource Investigator	-	-	-

Step 3: Behavioral Event Interviews

Behavioral event interviews were conducted by PMP tutors. Each candidate was interviewed for about twenty minutes to assess their level of leadership competence. Prior to the interviewing candidates' personality profiles were checked once more to look over the potential weaknesses and strengths of the students. The interviewing questions were mostly related to the demonstration of competences with regard to team-work, initiative, responsiveness to change, and interpersonal communication. In addition to these questions there were ones related to candidates' areas of improvement. For example a candidate with introverted attitude was questioned more about interpersonal understanding and communication. During the interviews, students' skills in presenting themselves and conveying their thoughts in a comprehensible manner and their self-confidence were also observed. In this final step all candidates (N=11) found to have adequate leadership competence to take on the leader role of first-year integrated design project teams.

These eleven students were selected to become the team leaders of first-year teams for two consecutive fifteen-week periods. Beyond any doubt the effectiveness of selected team leaders has to be measured. This measurement will be carried out by both assessing;
(a) Students' leadership competence and
(b) Their teams' effectiveness

Leadership competence will be measured through application of several instruments and techniques; 360 degree feedback process, analyses of personal diaries, the evaluation of two oral presentations delivered to the coach (one presentation per period), and the carrying out of behavioral event interviews.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Assessing the team effectiveness is also crucial for measuring leadership effectiveness. It has been argued that in order to know how a person is doing as a leader one needs to find out how the people under his/her leadership are doing[42]. Therefore, a leader's ability to *build an effective team* has been argued to be the key to his/her leadership effectiveness[43].

Five factors have been identified to be essential for team effectiveness[5];
- Team Health (i.e. trust, satisfaction, respect for each other)
- Effectiveness of Implementation (i.e. client satisfaction)
- Meeting Effectiveness (i.e. time management, clarity of agenda, listening)
- Effective Decision Making (i.e. participation of members in the decision making)
- Effectiveness of Team Objectives (i.e. objectives are specific, measurable, challenging and scheduled)

The effectiveness of first-year project teams will be measured by assessing the above-mentioned five factors. Table 8 presents the measurement methods used for evaluating each one of the five team effectiveness dimensions. The following section presents the preliminary results of Team Climate Survey.

Table 8: Measurement methods used for evaluating each team effectiveness dimensions

Criteria for Evaluating Team Effectiveness	**Measurement Methods**
1. Team Health	Team Climate Survey
2. Effectiveness of Implementation	o Satisfaction of project's stakeholders, namely first-year students and first-year professors. o Evaluation of the final products of the project (a design report and a poster or an oral presentation). o The management reports (team charter and close-out reports).
3. Meeting Effectiveness	Observation of formal meetings
4. Effective Decision Making	Observation of formal meetings
5. Effectiveness of Team Objectives	o Evaluation of the final products of the project (a design report and a poster or an oral presentation). o The management reports (team charter and close-out reports).

5. Team Climate Survey Results

5.1. Team Climate Survey

Researches have argued that *if the climate of a team is unsatisfactory, the team will not be able to produce a quality decision or effectively accomplish its objectives*[5]. The indicators of a healthy team climate are mainly[5]; confidence, trust, respect for each other, high level of communication, conflict resolution, satisfaction. In order to measure the climate in first-year project teams a survey, *Team Climate Survey*, has been designed.

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This survey consists of 22 items which addresses the indicators of a healthy team climate (i.e. "*I trust in all team members*"). The survey has been pilot-tested in 2006-2007 academic year. The reliability analysis yielded a high alpha coefficient (0.91), indicating high internal consistency among its 22 items. A copy of the questionnaire is available from the author upon request.

The survey employs a six-point Likert-type rating scale with all scale points labeled by verbal descriptors without the provision of a mid-point. The scale goes from 1 ("highly disagree") to 6 ("highly agree"). Team members were asked to use this rating scale to assess their level of agreement or disagreement with the survey items. The survey has been administered before the end of first academic semester (2007-2008).

5.2**.** Preliminary Results

A total of number of 49 first year students has completed the team climate survey. The number of members and the number of respondent students in each first-year project teams are presented in Table 9.

Table 9: Number of members and number of respondent students in first-year project teams

Leader Coding	Number of Members	Number of Respondents
L1	4	4
L2	5	5
L3	6	5
L4	6	6
L5	5	4
L6	3	3
L7	5	5
L8	6	3
L9	5	5
L10	6	6
L11	3	3
Total	54	49

Global team climate scores (for each leader's team) were obtained by averaging first-year students' ratings across the twenty-two items (Figure 3). In fact for all the team leaders, team climate scores were found to be equal or higher than Four (Agree). Of the eleven leaders, L1 and L2 have received higher global team climate scores. On the basis of previous research this result was expected. Both leaders have the two distinct leader types as their top two team role pairings; a combination of *shaper-coordinator* (Table 7). Belbin nicknamed this shaper-coordinator combination as *boss* to give the picture of the behaviour to be expected from those people with this type of combination. Therefore, it is understandable that leaders "L1" and "L2" have created and developed a more positive and healthy team climate which in turn shows that a leader's personality might have an impact on the team and its effectiveness.

UNIVERSITAT ROVIRA I VIRGILI
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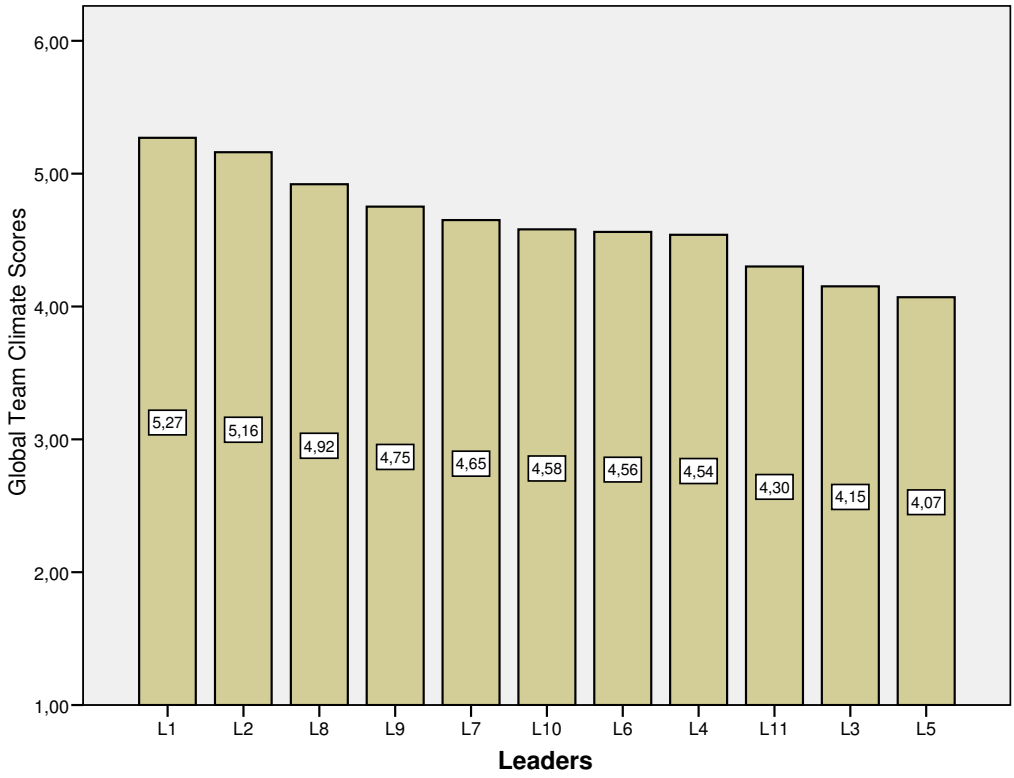

Figure 3: Global team climate scores

A curious incident took place just after the beginning of the second academic semester. The team under the leadership of "L11" broke up. This incident was interesting as this leader was the weakest fit to the leader selection criteria presented in this paper. However, to conclude that the personality of the leader was the main reason for the failure of the team, further analysis is required. Results from the focus group with the members of this team, which will be carried out in the end of the second academic semester, may provide an in-depth understanding of the possible reasons for this incident.

Conclusions

In this paper, a methodical leader selection process is presented for the identification of students with the highest potential to lead a project team. This powerful selection process provides a clear, objective, and research based method for the evaluation of leadership potential. The power of the process stems from integrating the variables that are most relevant to the making of a leader. This ensures that the very important responsibility of leadership is given to those students who are most capable of fulfilling.

Acknowledgements

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UNIVERSITAT ROVIRA I VIRGILI
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APPENDIX 2.4

Özgen, S., Alabart, J.R., Medir, "*Implementation of a 360 Degree Feedback Assessment Process for the Development of the Leadership Competence of Senior Engineering Students*", Proceedings of the 36th SEFI Conference, Session 1134, July 2-5, 2008, Aalborg, Denmark, ISBN: 978-90-8790-571-2 (oral presentation).

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Implementation of 360-degree feedback assessment process for the development of leadership competence of senior engineering students

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Abstract:
Project Management in Practice (PMP) course at the School of Chemical Engineering (Tarragona, Spain) aims to develop senior engineering students' leadership competence. Over the last decade, 360 degree feedback has been widely used in leadership development practices. This paper describes the implementation of the 360 degree feedback process into PMP course. Within the scope of this implementation, a "Leadership Competency Questionnaire" was designed and applied as an online tool. The effectiveness of the 360 degree process was evaluated in terms of obtaining students' reactions and perspectives about its implementation.

Keywords: 360 degree feedback, leadership development, engineering students

1. INTRODUCTION

Starting from 1995's School of Chemical Engineering (ETSEQ) at the University of Rovira i Virgili employs a competency-based educational model to help engineering students meet the demands of a notoriously competitive global future [1-3]. The model aims to align chemical engineering curriculum with future's top competences so that today's engineering students can effectively respond to tomorrow's job demands.

In the fast-paced and competitive new world, *leadership* became a major concern in many organizations and industry [4] which in turn triggered the need to develop leadership competence. For some time now there is an increased interest in identifying the best practices as how to implement a successful leadership development programmes [5-7]. Likewise, Project Management in Practice (PMP) course at ETSEQ aims to equip senior engineering students with leadership competence.

To facilitate students' leadership development, it is crucial to provide the students with the right feedback [4] so that students can identify their leadership strengths and blind-spots to create their developmental priorities [8]. Apparently, 360 degree feedback is the most prevalent and powerful process used to help development of leadership [8-12]. In fact, numerous studies have reported improvements in performance following 360^0 feedback [13-15].

In spite of its wide use in many companies and organizations, the effectiveness of the 360 degree feedback is rarely evaluated [16]. However, such evaluation is essential to ensure that the process was valuable to the participants.

This article presents the implementation of 360 degree feedback process into PMP course in the 2007-2008 academic year. The paper begins with a detailed description of the PMP course and follows with the presentation of the theory underlying 360 degree feedback process. The following section explains the sequential steps involved in the deployment of 360 degree feedback process. The last section presents students' reactions to the 360 degree feedback process.

2. PMP COURSE

Project Management in Practice (PMP) is an elective course aimed at enhancing fourth-year engineering students' competence in leadership and skills in project management and facilitation. In this course, part of the fourth year students take on the leader role of project teams composed of first-year students.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

First-year project teams work during two consecutive fifteen week periods on a design project concerning a manufacturing process (i.e. transformation of a specific raw material into different final products) and try to solve the design problems by applying the knowledge from their first-year courses. To help first year students cope with this challenging project-based learning experience, fourth year students are given the responsibility to take the leader role of the first-year project teams.

To ensure that first-year project teams are led by the students with the highest potential and motivation to lead, a methodical leader selection process is applied. After the selection, about a dozen students (one third of the class) become the leaders of first-year teams. Rest of the students works in various fourth-year project teams.

To support the development of leader students, PMP course implement both enabling and assessment processes that are key to leadership development. Enabling processes provide students with formal training, coaching and experiential learning processes (Figure 1).

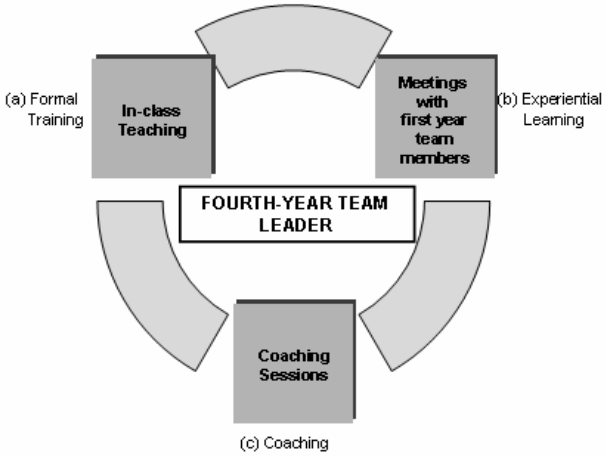

FIGURE 1: Leadership enabling processes implemented in PMP course

Formal training, done through in-class teaching, equips students with the key concepts relevant to leadership, project management, and facilitation techniques and tools (2 hours/week). Formal meetings with first-year project teams (1 hour/week) enable students to experience and apply those concepts that are thought in the class. The coaching sessions are conducted to help the leader students identify their development needs. Every leader student meets with their coach individually (one of the course professors) at least twenty minutes per week.

In addition to the enabling processes, leader students are also provided with feedback processes to help them realize their effective behaviours and the ones that need modification in relation to leadership, facilitation and project management. The feedback processes involve:

- Formal Meeting Observation Feedback: Leader students are monitored during their weekly meetings with first-year teams to determine how the leaders manage and facilitate their team meetings. The observation data are then formulated into a feedback report and sent to leaders and to their respective coaches.
- Team Climate Survey: The members of the teams at the end of each academic semester fill-out a survey to measure the climate within the team. This information is fed back anonymously to leaders.

In addition to above mentioned feedback process 360 degree feedback process, which constitutes the scope of this paper, is implemented to PMP course. This process aims to help leader students identify their leadership strengths and areas of improvement. The following section explains the theoretical background and the implementation of this particular process.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

3. THEORETICAL BACK-GROUND

The process of 360^0 feedback is fairly straight forward. It collects both self-ratings of leadership and leadership ratings from "significant others" and feeds back them in terms of a report to the focal person [11]. The perceived value of 360^0 feedback is based upon several theoretical principals:

- Obtaining information from multiple perspectives will yield a fuller and more accurate picture of performance strengths and weaknesses than observations from only one person [17-18]. This in turn enables the individual to accept the feedback as a valid comment on his/her actual behaviour [17] thus making it harder to discount negative feed-back as just one's person's view point [19].
- The process of self/other comparison increases the notion of self-awareness. When individuals compare their self-perception with others' views they develop an increased awareness about their actions [17-18] and their blind-spots.
- 360 degree feedback process can also help uncover and resolve conflict by allowing individuals to find the opportunity to express their opinions which might not otherwise have been expressed [18].

Basically 360 degree feedback is used for two major purposes; *developmental* and *evaluative*. The developmental feedback aims to enable the individuals to become more aware of their strengths and weaknesses and to identify areas of improvement. On the other hand evaluative feedback is used to make administrative decisions (i.e. salary administration, promotions) [17]. As it has been noted earlier, this process is implemented into PMP course for developmental purposes.

4. IMPLEMENTATION

In a typical 360 degree feedback process, the competence evaluations are gathered from the focal person's colleagues. In this study, team members have been selected as the feedback providers due to their frequent interaction with the team leader. This frequent interaction enables team members to provide more accurate information about leaders' performance than their clients and professors can do.

The 360 degree feedback process was implemented into PMP course in four sequential steps (Figure 2). Primarily, a "Leadership Competency Dictionary" was developed to form the basis of the 360^0 feedback competency questionnaire. Following this, students were trained about the process and the use of the on-line questionnaire. After the training, students answer the on-line questionnaire and feedback reports were sent. In the last step, a mini-survey was conducted on all students to evaluate the effectiveness of the implementation.

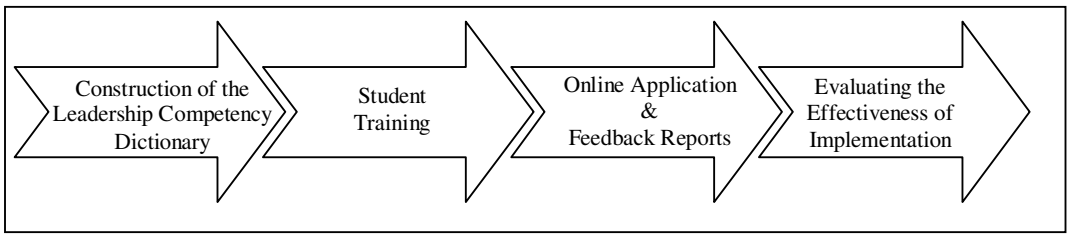

FIGURE 2: Sequential steps involved implementation of 360 degree feedback process into PMP course

(a) *Construction of the "Leadership Competency Questionnaire*"

Typically 360 degree feedback processes involve a competency questionnaire. For this purpose, a *"Leadership Competency Dictionary"* was created based on the Fundamental Concepts of Excellence of the EFQM Excellence Model [20]. Eight competences were identified to be related to effective leadership: Commitment to learning, interpersonal communication, drive for excellence, integrity, results orientation, client orientation, responsiveness to change, and teamwork. The dictionary involves three levels of proficiency. For the purposes of this study, the level which corresponds to "Team Leader" has been utilized. In the dictionary each of the eight competencies are explained in terms of a definition and five behavioural descriptors (See Table 1 as an example).

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INTEGRITY
The ability to harmonize honestly words and feelings with thoughts and actions, with the only purpose of doing the good for others, without any evil intention or willingness to cheat, to take advantage of, to manipulate or control them; reviewing constantly his/her own determination as struggling for congruence.
LEVEL 2 **COMPASSIONATE CONFRONTATION** Recognizes and confronts faults of integrity in others but within an authentic context of tact, concern, and warmth toward the others. ▪ Is able and willing to confront others as needed. ▪ Admits openly mistakes and faults. ▪ …

TABLE 1: Part of the integrity competency from the Leadership Competency Dictionary

The sum of the behavioural descriptors corresponding to eight competencies gives rise to a forty-statement questionnaire. Team leaders self-assess their current leadership competence along those behavioural descriptors. Likewise, team members rate their team leaders against the same set of behavioural descriptors.

The behavioural items in the questionnaire are evaluated on a "rating scale". In this study a five-point rating scale that has been proven to be extremely reliable and accurate, was used [21]. The scale goes from "much less than acceptable (coded 1) to "much more than acceptable" (coded as 5) with the inclusion of a "*I can not evaluate*" response.

The Leadership Competency Questionnaire has been completely automated by means of a web-based application (Boonsai®).

(b) *Student training*

One week prior to the application, a 360 degree feedback training program was held in university's congress hall. As the 360 degree feedback was new to the process participants (first and fourth year student), students were trained on:

- Objective of the process
- Understanding of the competencies and the rating scale
- Using the online questionnaire

The objective of the process was made explicit by clarifying that the process was implemented (a) to assist students in their development of leadership competence, and (b) *not* to use it as evaluation criteria for their final grade. In the training, explanations were provided on the definitions of the competencies against which leaders' performance would be assessed. Information was provided about how to access the web-application and how to complete the survey on-line.

Ground rules governing the issues of *confidentiality* and *anonymity* were also communicated. It has been ascertained that all individual responses would be kept confidential and would be stored in an electronic database. Students were informed that the scores would be averaged across all members of a team to protect the rater anonymity.

(c) *On-line application and feedback reports*

The application took place in the beginning of the second academic semester (February) allowing the first year students to have had observations on their team leaders for at least four months as suggested by the literature [4]. The week following the training, invitation emails were sent to students to inform that they can access and complete the survey questionnaire. The emails included the information about the URL link to the survey, the password and username required to access the survey.

Upon the completion of surveys all the ratings were then collected and compiled into a feedback report and mailed to leaders. The feedback provided the following information:

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1. Competency Model: Shows the competency model (competencies and their definitions in the dictionary) that the feedback is based on.
2. Competency Profile: Utilizes a radar diagram to summarize 360 feedback degree ratings for each of the eight competencies. Each one of the competencies is described by five behavioural statements and the ratings for each statement were collated and then assembled under their competency headings and then averaged. The ratings are summarized according to the respondent type (self and team members). For team members, ratings are averaged across that group. Any ratings for "I can not evaluate" are simply excluded from the averaging process (Fig 3a).
3. Behaviour Profile: Utilizes bar charts to represent the ratings for each one of the five behaviours that make up a competency (Fig 3b). Averages are presented for each respondent group. The behaviour average score shows the average of all rater scores (members and self) for each of the behaviour.

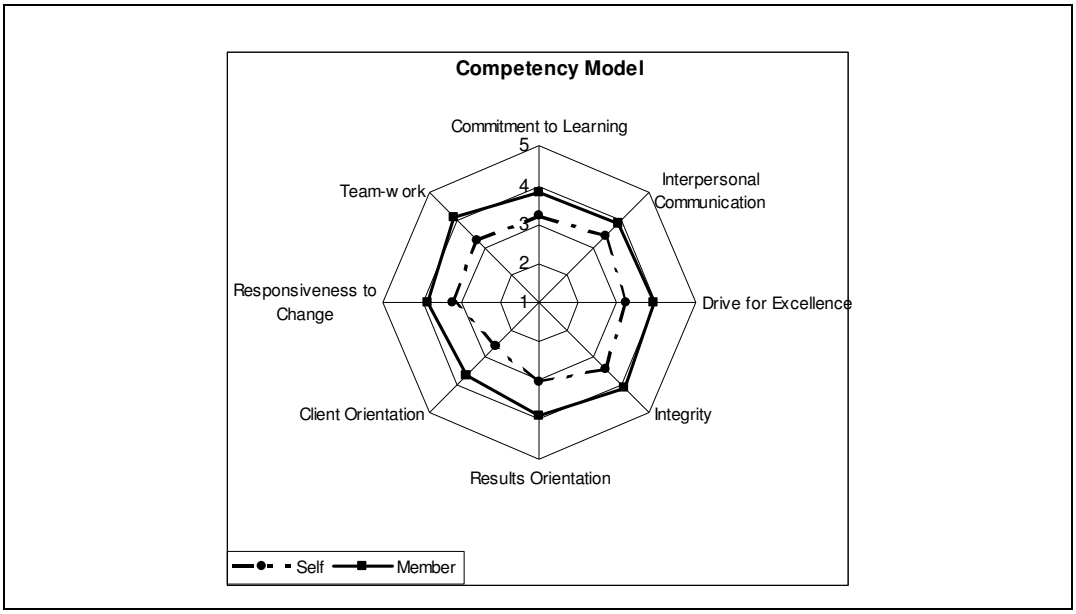

FIGURE 3a: Radar diagram illustrating the summary of ratings for each of the eight leadership competencies evaluated through 360 degree feedback process

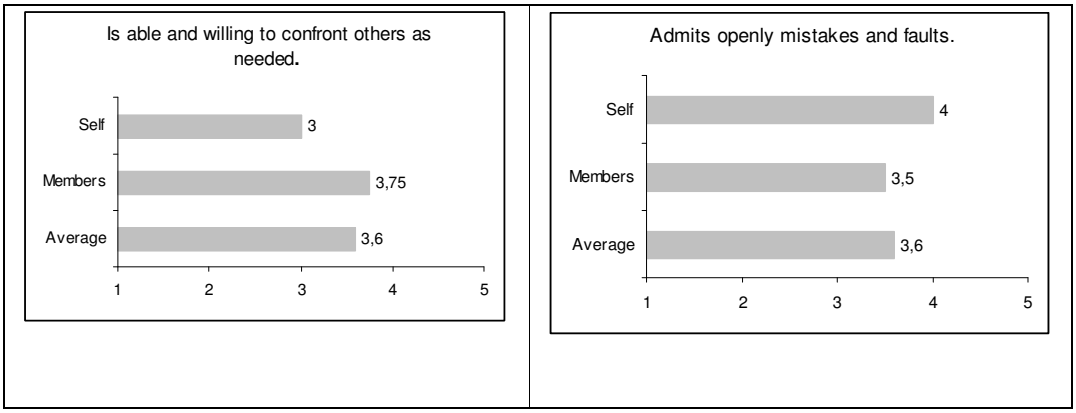

FIGURE 3b: Bar charts illustrating the ratings of two exemplary behavioural dimensions that make up the competency "integrity"

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

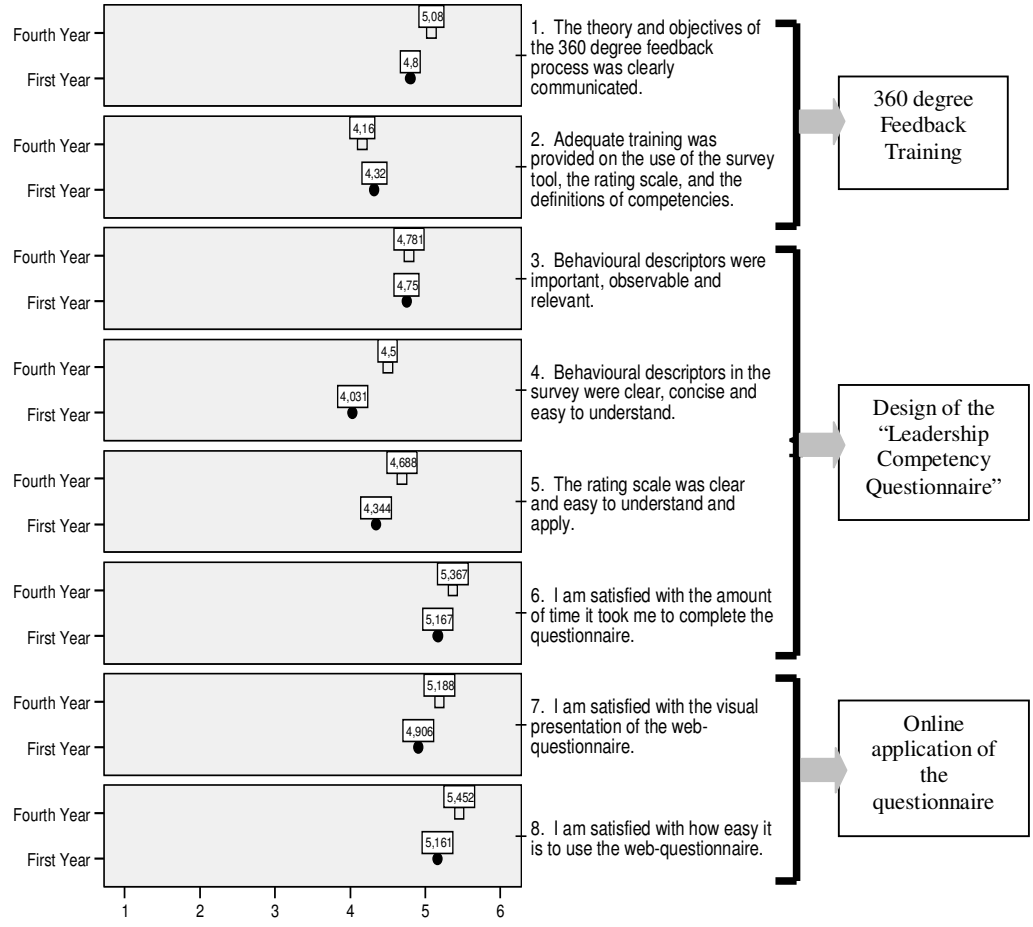
(d) *Evaluation of the effectiveness of the 360 degree feedback process implementation*

A mini-survey was devised to obtain students reactions and perceptions about the effectiveness of the 360 feedback process implementation using the following three criteria:

- 360 degree feedback training (two questions)
- Design of the "Leadership Competency Questionnaire" (four questions)
- Online application of the questionnaire (two questions)

The mini-survey contained a total of eight items and the students (first and fourth year) were asked to rate each item on a 6-point Likert-type scale, where 1=Very strongly disagree and 6= Very strongly agree.

The mean scores regarding students' level of agreement with the mini-survey items are summarized in Figure 4. Generally, students' reactions to the implementation of 360 degree feedback process were very positive. Student report high levels of agreement with the mini-survey items (mean scores > 4).



1=Very Strongly Disagree, 2=Strongly Disagree, 3=Disagree, 4=Agree, 5=Strongly Agree, 6=Very Strongly Agree

FIGURE 4**:** Students' level of agreement with the mini-survey items

Students agreed that the objectives of the 360 process were communicated clearly and that adequate training was provided on the use of survey tool and rating scale.

Students agreed that the behavioural descriptors in the Leadership Competency Questionnaire were important, observable. They also agreed that those descriptors were also clear, concise and easy to understand. Likewise, the rating scale was reported to be easy to understand and apply and the time required for the completion of the questionnaire was found to be satisfactory by the students.

Students highly agreed that it was easy to use the questionnaire online. Students were satisfied with the visual presentation (i.e. readability of text on screen, colour) of the online questionnaire.

5. CONCLUSIONS:

This paper has explained the implementation of a 360 degree feedback process to assist engineering students in their leadership development. As a part of the study, a "Leadership Competency Questionnaire" was developed and applied as an online questionnaire. In general the students demonstrated positive reactions to 360 degree feedback process and its implementation. The implementation of this process to the PMP course was found efficient in terms of the design of the questionnaire, its online application and students training about the process.

Acknowledgments

The authors are grateful to Mr. David Pàmies from Simpple, S.L., for his smart work to create the web-based application Boonsai® that automates the 360-degree feedback process, Mr. Enric Brull for his helpful insights when developing the Leadership Competency Dictionary based on the EFQM Excellence Model, and the AGAUR agency (project 2005MQD 00009) for the partial funding of this research project.

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ISBN:978-84-693-5423-0/DL:T-1414-2010

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APPENDIX 2.5

Özgen, S., Alabart, J.R., Medir, M., "*Learning Journals in Engineering Students' Leadership Development",* 11th International Leadership Association Conference, Leadership for Transformation, November, 11-14, 2009, Prague, Czech Republic (oral presentation).

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Learning Journals in Engineering Students' Leadership Development

The School of Chemical Engineering (ETSEQ) at the University of Rovira i Virgili (Tarragona, Spain) embeds leadership education into engineering curriculum through a *first-fourth year* integrated design project approach. This approach integrates horizontally all first year courses into a design project that challenges first-year teams to design a specific chemical plant by applying the theoretical knowledge from their first year courses. The very important responsibility of *leading* the first-year teams is taken over by part of fourth year students who are enrolled to Project Management in Practice course (PMP); bringing about the vertical integration of the fourth year course into first year design projects.

PMP course, offered annually as an elective course, is open to all fourth year chemical engineering students. However, only a part of the students (about a dozen) can become the team leaders of first year project teams. The main reason for this is that the number of available leader positions is limited by the number of project teams that can be formed by the first year students. For this purpose, PDP course implements a selection method to identify those students who have a high potential to lead and manage a team with the adequate motivation to do so. The selected team leaders work with their first-year project teams during two consecutive fifteen-week periods. Hence, in this team setting, fourth year team leader students have the opportunity to experiment and apply effective leadership behaviors by leading their teams along the whole academic year.

To foster students' leadership development PMP course brings together the key enabling and assessment processes in this field. One remarkable enabling process implemented in the course is the combined use of learning journals with personal coaching. In the course, learning journals are used as a means to facilitate leader students' reflective thinking process by encouraging them to reflect on their behavior as a leader and on the critical work events they experience during their journey as a leader. Those learning journals, with the consent of leader students, are shared by the coaches (course tutors). Coaches read the leader students' entries to the journals on a weekly basis before the individual coaching session with them. During the whole academic year, every week, coaches meet with their respective leader students to provide support that is tailored to the individual needs of each student in their development of leadership. Use of learning journals with individual coaching in the development of students' leadership has been proved effective by the results of the survey that has been applied to leader students at the end of 2007-2008 academic year. In this survey, leader students have been asked to report their experiences with learning journals and with individual coaching sessions. The results from the survey demonstrated that *learning journals* enabled leaders to become more self-aware and helped them to identify clearly the causes of the problems and the appropriate solutions for those problems. The results concerning the experience with coaching sessions revealed that *individual coaching sessions* helped students to increase their self-awareness and their confidence as a leader and helped them: (1) to perform their role as a leader, (2) to decide to practice the leadership behaviors that are out of their comfort zone, (3) to change the way they perceive the people and their problems, and (4) to improve their leadership effectiveness.

ISBN:978-84-693-5423-0/DL:T-1414-2010

In addition to its use as a development tool, learning journals can also be used to identify leadership behaviours and competences. For this purpose, at the end of the academic year 2007-2008, learning journals of eleven selected leaders have been used to codify the leadership behaviors recorded inside. The coding of leadership behaviors has been based on the "Competency Dictionary Alabart©" which is constituted by eight competencies; commitment to learning, interpersonal communication, drive for excellence, integrity, results orientation, client orientation, responsiveness to change, and teamwork and cooperation. These competencies have been developed according to three proficiency levels: leadership without title, team leadership, and organizational leadership.

From these eleven learning journals, a total of 1280 leadership behaviors have been coded. The percentage distribution of coded behaviors across the three proficiency levels is as follows: leadership without title (19.7%), team leadership (71.3%), and organizational leadership (9.1%). The high percentage of behaviors coded at the team leadership level (71%) shows that the leader students needed most to demonstrate and reflect on the behaviors corresponding to this proficiency level. The distribution of coded behaviors at this level across the eight competences is as follows (in descending order): teamwork and cooperation (33.9%), commitment to learning (22.7%), interpersonal communication (19.0%), results orientation (17.3%), drive for excellence (4.5%), integrity (2%), client orientation (0.4%), and responsiveness to change (0.2%). The high percentage of behaviors coded in the teamwork competence is understandable in the sense that one of the prime responsibility of leader students is to build the teams. The following competence, commitment to learning, explains the realization of one other major responsibility of leader students; that is to develop the first year students. The low percentage of the behaviors coded in the competence of responsiveness to change makes sense as continuous changes in general do not happen in design projects. However, the low percentage of behaviors coded in the client orientation competence implies the need to put more emphasis on the development of this competence.

The above-mentioned results suggest that this asymmetric team set-up provides fourth year engineering students with an excellent laboratory to learn to apply leadership behaviors associated with *team leadership*. Authors suggest that this asymmetric team set-up can be used by other faculties or institutions that desire to develop the leadership competence of their students.

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APPENDIX 2.6

Özgen, S., Alabart, J.R., Medir, M., Kantola, J., Vanharanta, L., "*Assessment of the Cycloid Application as a Tool to Assist Students in the Development of Personal and Social Competencies that are Key to Project Managers*", International Congress of University Teaching and Innovation, CIDUI, July 5-7, 2006, Barcelona, Spain (poster presentation).

UNIVERSITAT ROVIRA I VIRGILI
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ASSESSMENT OF THE CYCLOID APPLICATION AS A TOOL TO ASSIST STUDENTS IN THE DEVELOPMENT OF PERSONAL AND SOCIAL COMPETENCIES THAT ARE KEY TO PROJECT MANAGERS

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Summary

This paper discusses the usefulness of applying a competency-based evaluation tool to assist undergraduate chemical engineering students in their development of project management competencies. Fourth year chemical engineering students at the Escola Tècnica Superior d'Enginyeria Química of the Universitat Rovira i Virgili act as project managers in the project teams either formed by first year students or course peers. The project teams intended to develop the social and personal competencies that are key for project managers. Cycloid was piloted to the Project Management in Practice course to assess the applicability of the tool in the competency development efforts of project management students. Cycloid is a web-based self-evaluation application, which focuses on professional competencies of project managers. Cycloid evaluates a total of 30 project management competencies through the process of self-evaluation against 120 behavioral-based statements and aims to illustrate the gap between project managers' current state and personal vision, i.e. the creative tension. Preliminary results showed that Cycloid application helped project manager students to realize their current level of competencies as well as the areas of improvement related to project management occupation. In addition to this, a difference between the perceived needs of the two student groups has been observed as a consequence of the structural difference of the project teams. These results can be used to direct personnel development and training efforts to areas where they are most needed by redesigning the PMP course syllabus.

Keywords: Project management, personal and social competencies, Cycloid.

1. Objectives

Project management and teamwork are essential to engineering or, stated in other words; design team failure is usually due to failed team dynamics (1). Accordingly, the Escola Tècnica Superior d'Enginyeria Química (ETSEQ) of the Universitat Rovira Virgili (URV) has devised and deployed a project-based cooperative learning methodology to all of the courses of the first three years of its Chemical Engineering (ChE) program (2, 3).

Fourth-year students enrolled in the Project Management in Practice (PMP) course act as project managers of project teams formed by first-year students. First-year students are involved in their first Integrated Design Project (IDP), a project that lasts a whole

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academic year and that involves all of the first-year courses. While teamwork is the competency development priority for first-year students, project management is the corresponding one for fourth-year students.

The IDP is an excellent simulation of project management professional practice. To be successful in this environment, fourth-year students must simultaneously be leaders, managers, facilitators and mentors (4) and, consequently, develop the underpinning personal and social competencies. Amongst these, the following nine differentiating competencies for project managers have been identified: management, analytical thinking, conceptual thinking, developing others, self-confidence, initiative, information seeking, achievement orientation, and collaboration (5). These differentiating competencies distinguish superior from average performers.

Cycloid is a web-based self-evaluation application for project managers (6). This self-evaluation focuses on the most essential and critical personal and social competencies for that role. Consequently, the Cycloid application might potentially be a suitable tool for our fourth-year Ch.E. students to support their competency evaluation and development efforts.

The purpose of this paper is threefold:

1. To ascertain the usefulness of the Cycloid application for the fourth-year students enrolled in the PMP course regarding their competency development efforts.

2. To determine whether there are any statistically significant differences between the self-perception of two different groups of fourth-year students enrolled in the same PMP course. The ones that act as project managers of project teams formed by first-year students (PM4-1) and another group of fourth-year students working in project teams formed by course peers (PM4-4).

3. To see the match between the competencies that students perceive as needed for improvement and the differentiating competencies that has been observed in superior project managers.

2. Description

2.1 The Cycloid application and the Evolute technology

Evolute is the name for a generic web-based technology that supports fuzzy logic applications on the Internet (7, 8). This means that Evolute enables an unlimited number of special purpose fuzzy logic (9) applications to be developed and run globally. Each application is based on a specified ontology of the target domain (8). Therefore, each application on Evolute has a unique content and structure specified by the experts of the target domain. Applications can be added and fine-tuned on-line without additional programming. Evolute represents co-evolutionary methodology by supporting co-evolutionary applications, which are intended for helping in simultaneous development of business enterprises or systems (10) that include humans and organizations.
Cycloid is an application of the Evolute technology that focuses on the evaluation of key personal and social competencies for project managers (6, 8, 10). Cycloid evaluates

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a total of 30 competencies through the process of self-evaluation against 120 behavioural-based statements. Respondents are asked to choose and determine the frequency of their behaviours in the situations presented by the each given statement. How often these behaviours occur in the statements are evaluated both at present and target stages to evaluate the *creative tension* (11). Upon completing the self-assessment, respondents receive a report that allows them to see their individual creative tensions for the 30 competencies (see Figure 1). The creative tension helps both the project manager and the management to evaluate the needs for targeted training and development. The results can be used to direct personnel development and training efforts to areas where they are most needed.

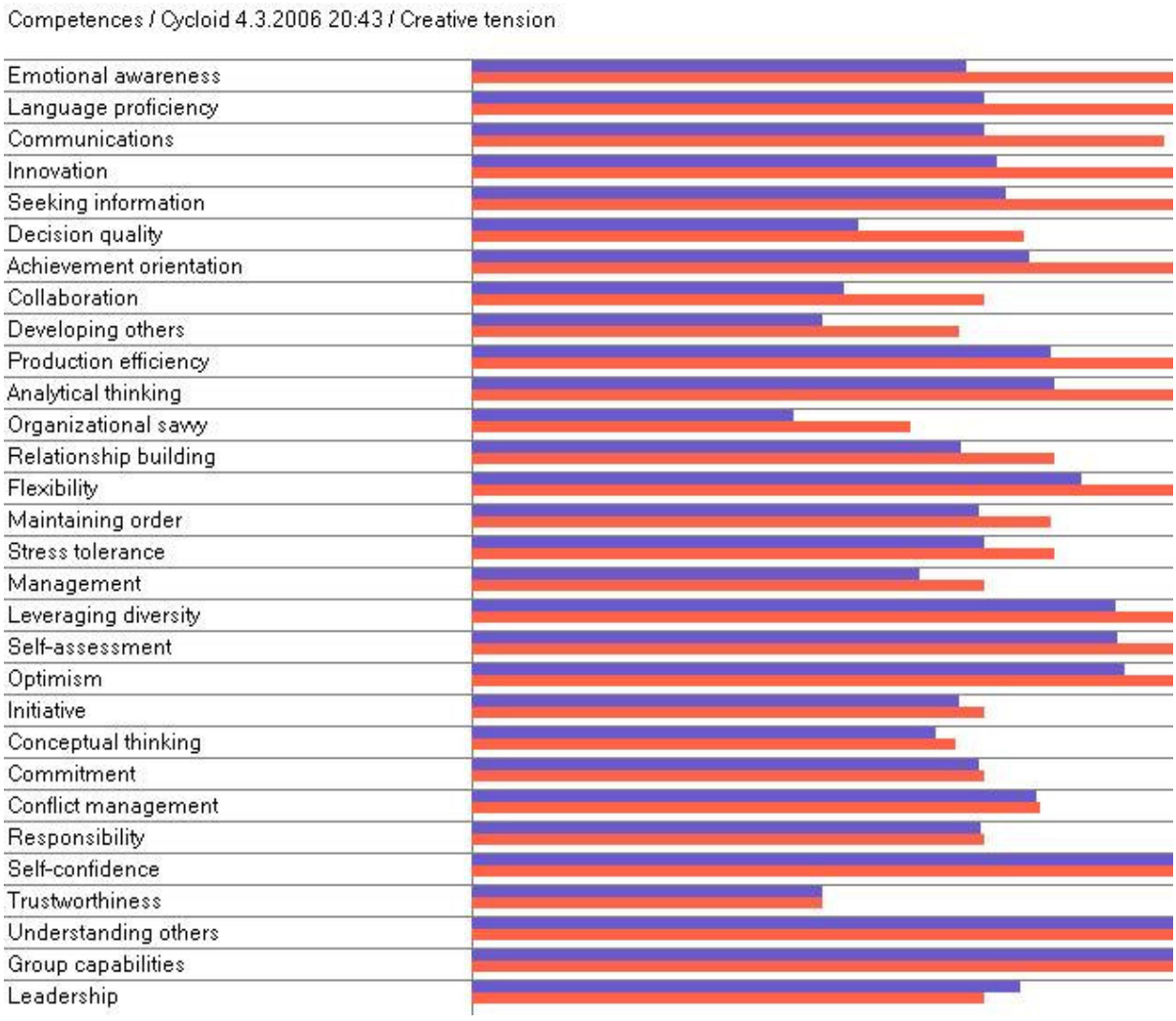

Figure 1:. Bar diagram showing the creative tensions for the 30 competencies evaluated through Cycloid by an individual. The red and blue bars represent the individual's target and current levels respectively.

Cycloid can also generate results for groups, which allow the researchers to analyze the creative tension of the whole group (see Figure 2).

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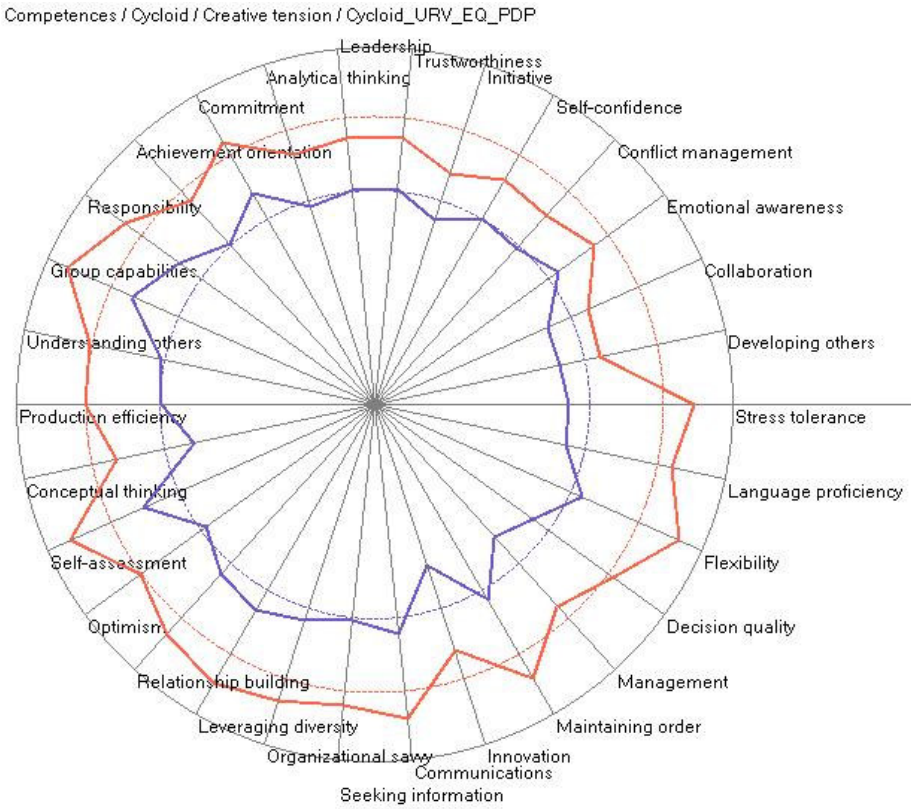

Figure 2: Radar diagram portraying the creative tensions of a whole group. The red line represents the target level while the blue line the current level.

For our research purposes, the results were investigated on group basis rather than individual one where two separate student groups were created according to their role in the PMP course which are namely; PM4-4 and PM 4-1. Relative creative tensions for the 30 competencies has been evaluated separately for the two student groups to observe any significant differences between the groups' perceived needs for competency development, if it exists at all. Relative creative tension is calculated according to the equation given below;

Relative Creative Tension = Target Level/Current Level (12) (1)

In addition to group differences, it was aimed to observe if the groups' perceived need was directed towards the differentiating competencies or not. For project managers, 9 differentiating competencies are identified in literature which are namely; management, analytical thinking, conceptual thinking, developing others, self-confidence, initiative, information seeking, achievement orientation, and collaboration (5). Therefore, the emphasis was given on the groups' top 10 relative creative tension to see how well these competencies fit with the differentiating competencies.

The statements and the results of Cycloid can be seen in different languages such as English, Spanish, Catalan, and selection of the language is free to will.

ISBN:978-84-693-5423-0/DL:T-1414-2010

2.2 Sample description

The participants in the study are 39 Chemical Engineering students who are enrolled in the fourth-year Project Management in Practice (PMP) class for 2005-2006 academic year. Out of these 39 students, 15 students act as project managers of the teams formed by first-year students (the PM4-1 group). The remaining 24 students are involved in other project teams with their course peers (the PM4-4 group). All of the students have received training in team-based project management in another course named Project Management, which is taught in parallel to the PMP course.

The Cycloid application was piloted to the PMP course in the middle of the second academic semester when all of the students had completed their project management based training and learning. Prior to the application, Cycloid was introduced to the students by a short presentation in a class where the theoretical basis of the system (creative tension) was explained as well as how to use it properly. Also an exemplary report generated by the system like the one in Figure 1 was shown to the students to enhance their understanding about interpreting their personal results.

For the Cycloid application each student received a user-id and password via email from the Evolute-Cycloid system. One hour of PMP class was devoted to the application and two computer rooms were reserved for this purpose. A 2 weeks-window time was given to the students who could not finish their self-evaluation in the time allotted for this exercise in the class. Students were informed about that Evolute system gives the individuals the opportunity to download their personal reports, which enables the respondent to reflect more on the results of his/hers.

It has been guarantied that students' individual answers in this application would be strictly confidential that no other students or course lecturers would be able to identify them and also it has been guarantied that they would not be graded according to their self-evaluation results.

Personal Development Plan and Cycloid Feedback Survey

Upon finishing the self-evaluations, the students were asked to write a personal development plan according to their results from Cycloid and they were asked to form their short assays regarding the questions given below;

1- Which of the competencies do you think you should center your efforts for improvement and why?
2- Choose a particular competency among the ones determined in the previous step and formulate a goal of improvement for this competency
3- State how you may improve this competency in your project teams

One week was given to the students to turn back their assays.

A questionnaire was distributed to the students with the specific intent to investigate the effectiveness and usefulness of Cycloid in the self-developmental efforts of the students.

The questionnaire consisted of 12 questions which 4 of them utilize Likert-like scale items with balanced scales asking the students to state their degree of agreement to the

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given statements about Cycloid application such as: "*The survey evaluate correctly the current level of my personal competencies*". Three ranking questions were related to competencies like: "*Which competency do you consider more important*?" Two open-ended questions were provided to students to write any positive or negative comments they have about this self-evaluation. The remaining items in the questionnaire were used for the determination of the demographic properties of the students.

3. Results

The Cycloid application was completed by 97.5% of the sample students. Table 1 collects the relative creative tensions for the 30 competencies of the two student groups; PM4-4 and PM4-1. Statistical analysis was carried out (Student's t-test) to see if there exist a significant difference between the self-perceptions of the two student groups. Results showed that there is a significant difference between the groups in the competencies of emotional awareness and group capabilities. For both of the competencies the relative creative tensions were higher in the PM4-1 group than PM4-4 group (Table 1) which indicates a higher perceived need for the development of these two competencies. Emotional awareness and group capabilities enables individuals to better understand others, build and maintain friendly and warm relationships in achieving work-related goals (5). These behaviours are important for PM4-1 group as they underpin a number of other behaviours including leading and developing others where the role of PM4-1 requires the relationship building with the 1st year students. Therefore this experience may possibly force the members of this group perceive an increased need towards understanding their team members and building a friendly relationship with them.

In the scope of the study it was also aimed to see how well the differentiating competencies fit with the competencies with the highest creative tension. For this reason, focus was given to the top ten competencies. As can be seen from Table 1, a high similarity (70%) was observed between the groups' highest creative tensions. The perceived need for development was mostly towards the generic competencies rather than the differentiating ones. Even though a better match was observed with the PM4-1 group (analytical thinking, conceptual thinking, management, and seeking information) additional training and development will most likely be required for differentiating competencies. The improvement of these differentiating competencies would result in a higher impact on the development of managerial competencies. In relation to the According to these results PMP course syllabus may be redesigned to give additional training on these differentiating competencies to enhance the total impact.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 1: Student group results showing the relative creative tensions for the 30 competencies evaluated in Cycloid.

STUDENT GROUPS			
PM4-1		PM4-4	
Competency	Relative Creative Tension	Competency	Relative Creative Tension
Achievement orientation	1.40	**Achievement orientation**	1.31
Analytical thinking	1.54	**Analytical thinking**	1.28
Collaboration	1.27	**Collaboration**	1.27
Commitment	1.28	Commitment	1.25
Communications	1.49	Communications	1.44
Conceptual thinking	1.69	**Conceptual thinking**	1.50
Conflict management	1.21	Conflict management	1.27
Decision quality	1.91	Decision quality	1.60
Developing others	1.32	**Developing others**	1.21
Emotional awareness	1.44	Emotional awareness	1.17
Flexibility	1.51	Flexibility	1.66
Group capabilities	1.46	Group capabilities	1.22
Initiative	1.37	**Initiative**	1.26
Innovation	1.66	Innovation	2.16
Language proficiency	1.97	Language proficiency	1.66
Leadership	1.35	Leadership	1.26
Leveraging diversity	1.38	Leveraging diversity	1.36
Maintaining order	1.49	Maintaining order	1.54
Management	1.61	**Management**	1.66
Optimism	1.43	Optimism	1.44
Organizational savvy	1.52	Organizational savvy	1.37
Production efficiency	1.34	Production efficiency	1.42
Relationship building	1.66	Relationship building	1.35
Responsibility	1.36	Responsibility	1.28
Seeking information	1.54	**Seeking information**	1.45
Self-assessment	1.34	Self-assessment	1.40
Self-confidence	1.24	**Self-confidence**	1.32
Stress tolerance	1.94	Stress tolerance	1.81
Trustworthiness	1.18	Trustworthiness	1.33
Understanding others	1.55	Understanding others	1.34

Notation	The top 10 creative tension for PM4-1	The top 10 creative tension for PM4-4

∗Competencies with bold characters show the 9 differentiating competencies

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Personal Development Assay

Upon finishing the Cycloid application, the students were asked to write a personal development essay according to their results from Cycloid. All of the students who have completed their self-evaluation (38 students) have sent their short essays. In their essays students were primarily asked to determine the competencies that they think require improvement. Table 2 presents student groups' mostly suggested competencies for developmental efforts.

Table 2: Student groups' mostly suggested competencies for developmental efforts

PM4-1	PM4-4
Stress Tolerance	Stress Tolerance
Understanding others	Understanding others
Innovation	Innovation
Language proficiency	Language proficiency
Relationship building	Self-confidence
Quality of decisions	Management

According to students' personal development essay stress tolerance, understanding others, innovation and language proficiency appear as the common competencies that have been suggested for improvement for both the student groups. PM4-1 group think that relationship building and decision quality should also be one of the competencies to be improved whereas PM4-4 group stated that they should also center their efforts on the development of self-confidence and management.

In their essays, students were also asked to select a particular competency that they want to developmental objective. Figure 3a and 3b shows this selection by the two student groups; PM4-1 and PM4-4 respectively.

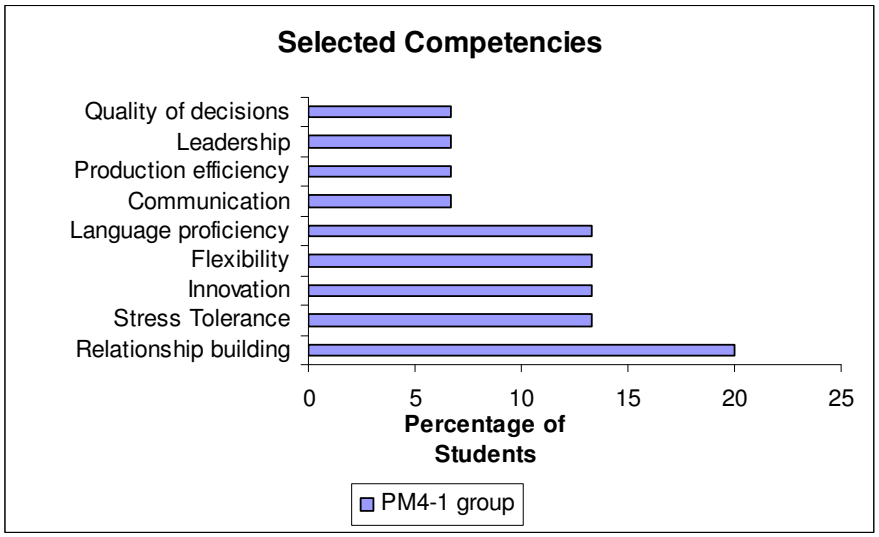

Figure 3a: Selection of the competencies for a developmental goal by the PM4-1 group.

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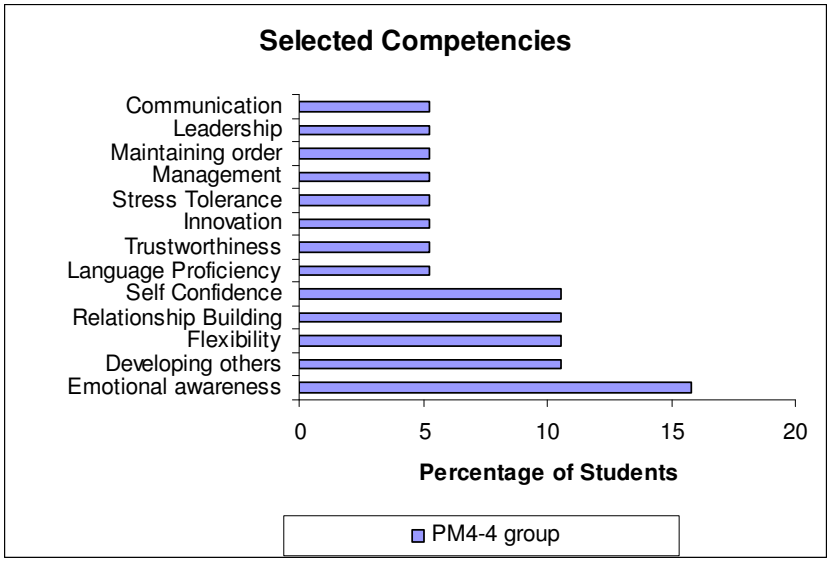

Figure 3b: Selection of the competencies for a SMART goal by PM4-4 group.

As the figures show, two student groups' choices for competency development differ from each other. PM4-1 group mostly wants to develop a SMART goal on the competencies of relationship building, stress tolerance, and innovation whereas PM4-4 group chose the competencies of emotional awareness, developing others and flexibility for developmental reasons. Leadership, communication, language proficiency, flexibility, innovation, stress tolerance and relationship building are the common competencies for the developmental goal for both of the student groups.

An interesting result appeared when we want to see if the students have selected their particular competency for developmental objective among their individual 5 competencies with the highest creative tension (Figure 4).

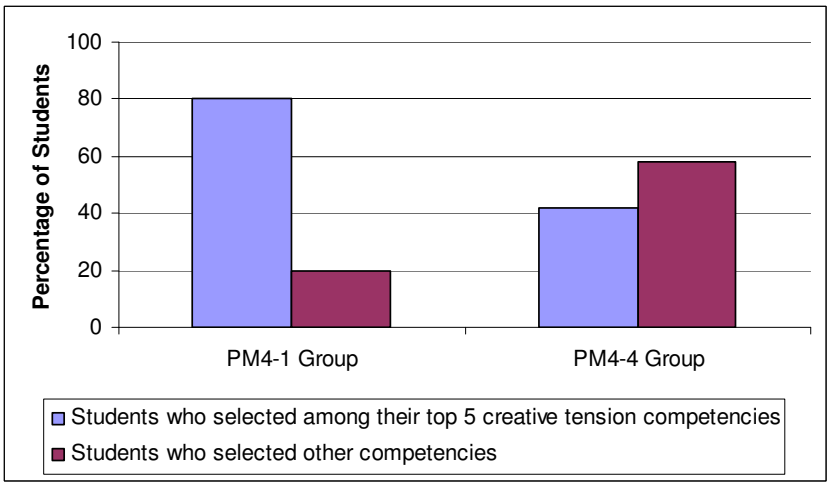

Figure4: Selection of the competency among the competencies with the top 5 creative tensions

Results showed that nearly 80% of the PM4-1 group selected their competency among their individual top 5 competencies with the highest creative tensions whereas this percentage was around %40 for PM4-4 group.

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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Cycloid Feedback Survey:

Upon receiving the students' short essays; a survey about Cycloid was distributed to students via email to get their feedback about the effectiveness of the tool. 73% of both student groups agreed that the results showed in the final report had evaluated correctly the current level of their *personal* competencies. Again nearly 55% of the students from the two groups agreed that the system and the report evaluated correctly their current level of *social* competencies. From the survey it also became clear that this self-evaluation has led students to realize that they are in the need of developing some of their competencies (Figure 5). This result was important in terms of showing how the Cycloid application was beneficial for students to realize their areas of improvement on a competency base.

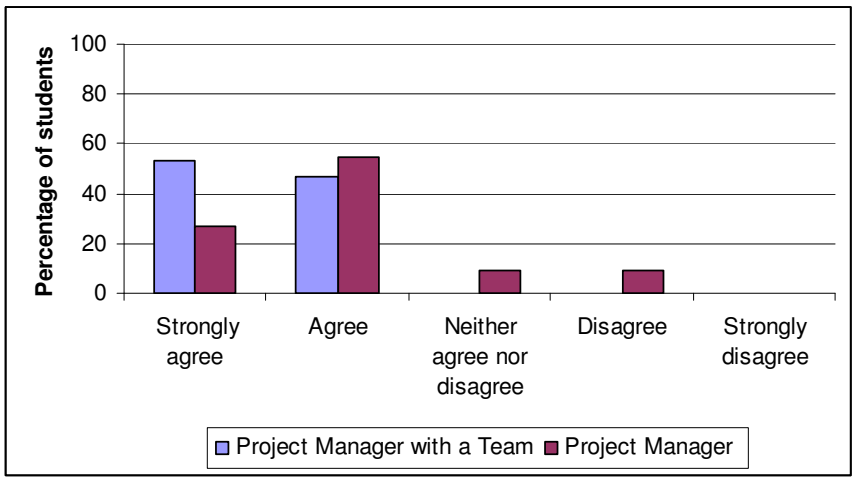

Figure 5: The percentage of students according to their level of agreement to the statement: *"The evaluation made me realize that I should improve some of my competencies"*

The students agreed they would make some efforts for the improvement of the competencies (73% of PM4-1 strongly agreed and; 59% of PM4-4 group agreed). The PM4-1 group perceives each competency group (self-knowledge, self-control, cognitive capacity, social skills, and motivating one-self) as almost equally important. The PM4-4 group considers self-knowledge as the most important competency group. Both student groups think that the social skill competency group might be developed with much more ease relative to the other competency groups during their project studies.

Beyond the questions asked in the survey, students were encouraged to state their any positive or negative opinions regarding Cycloid application. The majority of the respondents found Cycloid as an interesting tool which help them realize their current level of competencies and their competencies need improvement. Students found these self-assessment results very beneficial. They claimed that they will have an opportunity to improve the required managerial competencies before they enter a job and without trying to attain these competencies by spending years of effort in their job. One of the students (a leader) also explained that he/she would like to carry-out the self-evaluation in future to observe if any improvement in his/her either current or target levels could be seen. It was a promising approach for us to see that the students may fully comprehend, understand, and apply this tool for their improvement of competencies due to the fact that the future study suggest the application of the several times during a whole

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academic year. By this means any change in the creative tension of competencies could be determined; any improvement or inefficiency could be observed hence the necessary course of action could be taken for the students' development.

Also the future study suggests the application of a 360^{o} task-specific feedback from the team members (1st year students) and peers to help students adjust their self-perceptions and to keep their work-related activities directed towards desired personal goals.
The only negative opinion was related to one type of the statements in Cycloid. Some students experienced difficulty in positioning their frequency of behaviours against statements given in the negative order.

4. Conclusions

Preliminary results show that the Cycloid application clearly helps our students to recognize both their own current reality in relation to a series of key project manager personal and social competencies and their specific needs for personal development. Each student was satisfied with the test results. They authenticated that the results resembled their own perception of their competencies.
The results also showed that there exists a statistically significant difference between the perceptions of the two student groups for the competencies of emotional awareness and group capabilities. The structural difference in the formation of the student groups has led to differences in the perceived need of competencies between the groups.
The students' perceived need for development was mostly towards the generic competencies rather than the differentiating ones so PMP course syllabus may be redesigned for targeted training and development of differentiating competencies.
The future study suggest the integration of Cycloid to PMP course syllabus to apply the tool in different segments of the whole academic year to observe and follow-up the any differences in the self-perceptions of the students. Accordingly 360^{o} feedback would also be included to help students adjust their self-perceptions and to keep their work-related activities directed towards desired personal goals.

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APPENDIX 3

for the Methodology Chapter

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APPENDIX 3.1

CHARACTERISTICS OF 16 MBTI TYPES

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Appendix 3.1: Characteristics of the sixteen MBTI types

ISTJ Quite, serious, earn success by thoroughness and dependability. Practical, matter-of-fact, realistic, and responsible. Decide logically what should be done and work toward it steadily regardless of distractions. Take pleasure in making everything orderly and organized-their work, home, life. Value traditions and loyalty.	**ISFJ** Quiet, friendly, responsible, and conscientious. Committed and steady in meeting their obligations. Thorough, painstaking, and accurate. Loyal, considerate, notice and remember specifics about people who are important to them, concerned with how others feel. Strive to create an orderly and harmonious environment at work and at home.
INFJ Seek meaning and connection in ideas, relationships, and material possessions. Want to understand what motivates people and are insightful about others. Conscientious and committed to their firm values. Develop a clear vision about how best to serve the common good. Organized and decisive in implementing their vision.	**INTJ** Have original minds and great drive for implementing their ideas and achieving their goals. Quickly see patterns in external events and develop long-range explanatory perspectives. When committed, organize a job and carry it through. Skeptical and independent, have high standards of competence and performance—for themselves and others.
ISTP Tolerant and flexible, quiet observers until a problem appears, then act quickly to find workable solutions. Analyze what makes things work and readily get through large amounts of data to isolate the core of practical problems. Interested in cause and effect, organize facts using logical principles, value efficiency.	**ISFP** Quiet, friendly, sensitive, and kind. Enjoy the present moment, what's going on around them. Like to have their own space and to work within their own time frame. Loyal and committed to their values and to people who are important to them. Dislike disagreements and conflicts; do not force their opinions or values on others.
INFP Idealistic, loyal to their values and to people who are important to them. Want an external life that is congruent with their values. Curious, quick to see possibilities, can be catalysts for implementing ideas. Seek to understand people and to help them fulfil their potential. Adaptable, flexible, and accepting unless a value is threatened.	**INTP** Seek to develop logical explanations for everything that interests them. Theoretical and abstract, interested more in ideas than in social interaction. Quiet, contained, flexible, and adaptable. Have unusual ability to focus in depth to solve problems in their area of interest. Skeptical, sometimes critical, always analytical.

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Appendix 2.1 Continued

ESTP Flexible and tolerant, they take a pragmatic approach focused on immediate results. Theories and conceptual explanations bore them—they want to act energetically to solve the problem. Focus on the here and now, spontaneous, enjoy each moment that they can be active with others. Enjoy material comforts and style.	**ESFP** Outgoing, friendly, and accepting. Exuberant lovers of life, people, and material comforts. Enjoy working with others to make things happen. Bring common sense and a realistic approach to their work, and make work fun. Flexible and spontaneous, adapt readily to new people and environments. Learn best by trying a new skill with other people.
ENFP Warmly enthusiastic and imaginative. See life as full of possibilities. Make connections between events and information very quickly, and confidently proceed based on the patterns they see. Want a lot of affirmation from others, and readily give appreciation and support. Spontaneous and flexible, often rely on their ability to improvise and their verbal fluency.	**ENTP** Quick, ingenious, stimulating, alert, and outspoken. Resourceful in solving new and challenging problems. Adept at generating conceptual possibilities and then analyzing them strategically. Good at reading other people. Bored by routine, will seldom do the same thing the same way, apt to turn to one new interest after another.
ESTJ Practical, realistic, matter-of-fact. Decisive, quickly move to implement decisions. Organize projects and people to get things done, focus on getting results in the most efficient way. Take care of routine details. Have clear set of logical standards, systematically follow them and want others to do so. Forceful in implementing their plans	**ESFJ** Warm-hearted, conscientious, cooperative. Want harmony and work in determination to establish it. Like to work with others to finish tasks on time and accurately. Loyal, follow through in small matters. Notice what others need in their day-to-day lives and try to provide it. Want to be appreciated for who they are and for what they contribute.
ENFJ Warm, empathetic, responsive, and responsible. Highly attuned to others' emotions, needs, and motivations. Find potential in everyone, want to help others fulfill their potential. May act as catalysts for individual and group growth. Loyal, responsive to praise and criticism. Sociable, facilitate others in a group, and provide inspiring leadership.	**ENTJ** Frank, decisive, assumes leadership readily. Quickly see illogical and inefficient procedures and policies, develop and implement systems to solve problems. Enjoy long-term planning and goal setting. Usually well informed, well read, enjoy expanding knowledge and sharing it. Forceful in presenting their ideas.

Source: Vargas, 2005

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APPENDIX 3.2

BEHAVIORAL EVENT INTERVIEW PROTOCOL

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1. Introducción y explicación

1.1 Presentarse de una manera amable y humilde.
1.2 Explicar el objetivo y la estructura de la entrevista.
1.3 Poner énfasis en que se mantendrá la confidencialidad.
1.4 Pedir permiso para grabar la entrevista.

1.a Desarrollo de carrera

1.a.1 Las preguntas específicas se deberían centrar en:

- Antecedentes educativos y experiencias previas (antes de entrar en la E.T.S.E.Q.) que puedan haber ayudado al entrevistado a desempeñar su rol en el P.D.I.
- Experiencias en los anteriores P.D.I.

1.a.2 Sea breve en esta parte de la entrevista (5-10 minutos).

Ejemplos de preguntas:
Antes de entrar en esta carrera, ¿has tenido algún tipo de experiencia con el trabajo en equipo?
¿Qué es lo que tenias que hacer?
¿Cuántos proyectos integrados has hecho?
¿Qué es lo que has podido extraer de la participación en estos proyectos?

2. Responsabilidades del rol en el equipo

- No invertir más de 10 a 15 minutos en esta parte de la entrevista.
- Asegurar que los entrevistados clarifiquen todas las palabras de su jerga profesional.
- Obtener el suficiente detalle a fin de estimar cuánto tiempo la persona consume en cada actividad.
- Utilizar la descripción que el entrevistado ha dado sobre las tareas y responsabilidades para realizar una transición "natural" hacia la descripción de un incidente crítico.

Ejemplos de preguntas:
¿Cuál es tu rol en el equipo del proyecto integrado que estás realizando ahora?
¿Cuáles son tus tareas o responsabilidades principales?
¿Qué haces exactamente? Por ejemplo, ¿qué haces en un día determinado, en una semana, etc.?

3. Incidentes críticos

- ¿Qué pensaba el entrevistado acerca de los demás (por ej. positiva o negativamente) o acerca de la situación (por ej. pensamientos para la resolución de problemas)?
- ¿Qué sentía el entrevistado (por ej. miedo, confianza, excitación, etc.)?
- ¿Qué quería hacer el entrevistado (por ej. hacer algo mejor, impresionar al patrocinador, etc.)?

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Ejemplos de preguntas:
¿Cómo era la situación? ¿Qué es lo que había pasado anteriormente? ¿Qué lo causó?
¿Qué acontecimientos dieron lugar a esta situación?
¿Quién estaba involucrado?
¿Qué estabas pensando sobre esto? ¿Qué sentías? ¿Qué querías hacer en aquella situación?
¿Qué hiciste / dijiste realmente?
¿Cuál fue el resultado? ¿Qué pasó como consecuencia de todo esto?

Buenas prácticas:
- Empezar con un incidente positivo.
- Conseguir la descripción del incidente en la secuencia temporal adecuada.
- Hacer preguntas que lleven al entrevistado a discutir una situación real.
- Hacer preguntas cortas para profundizar – de 6 a 10 palabras – y en tiempo pasado.
- Hacer preguntas indagatorias para investigar qué pensamientos se encuentran detrás de las acciones.
- Indicar explícitamente al entrevistado cuándo está dando una respuesta útil con el objetivo de animarlo y así obtener más respuestas útiles: *"Esto es exactamente lo que busco." "¡Esto es un ejemplo muy bueno para el estudio!"*
- Entender que la entrevista puede suponer una experiencia muy emocional para el entrevistado.

Errores a evitar:
- Evitar hacer preguntas que lleven al entrevistado a abstracciones.
- No usar preguntas inductivas o intentar llegar directamente a conclusiones.
- No reflejar o parafrasear lo que el entrevistado dice.
- Evitar preguntas indagatorias que pueden limitar el alcance de incidentes críticos del entrevistado.

Problemas y su tratamiento:
- El entrevistado no puede pensar en un incidente específico.
  Explicar una experiencia propia en forma de incidente crítico.
  Dar un ejemplo de un buen incidente crítico de algún otro entrevistado.
  Referirse a alguna cosa que el entrevistado ha mencionado anteriormente durante la entrevista.
- Vaguedad – preguntar por detalles, hechos, citas.
- El entrevistado se preocupa sobre la confidencialidad de la entrevista– Se le debe tranquilizar y ofrecérsele el parar la grabación cuando sea necesario.
- El entrevistado toma el control de la entrevista y habla sin cesar – Interrumpir y preguntar por detalles.
- El entrevistado pide consejos al entrevistador – Devolver la pregunta, evitar sugerencias.

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4. Características necesarias para realizar el trabajo.

1) Conseguir incidentes críticos adicionales en áreas que puedan haberse pasado por alto.
2) Hacer que el entrevistado se sienta seguro y apreciado preguntándole por su opinión de experto en el desempeño del rol.

Ejemplos de preguntas:
La última cosa que querría preguntarte es: ¿qué características, conocimientos, capacidades o habilidades piensas que son necesarias para llevar a cabo tu rol en el equipo? Si tuvieras que escoger una persona para hacerlo, ¿qué buscarías?

5. Conclusiones y resumen

Conclusión:

- Agradecerle al entrevistado por su tiempo y la "valiosa información" aportada.
- Intentar que el entrevistado se sienta tan seguro y apreciado como sea posible.

Resumen por escrito:

- Si hay tiempo, este es el mejor punto para tomar notas sobre la entrevista ya que la memoria está todavía fresca.

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APPENDIX 3.3

TEAM CLIMATE SURVEY

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Sibel Özgen
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TEAM CLIMATE SURVEY

Please indicate in which team you are working and what your role is in the team

Team: _____.

Team Leader ☐
Team Member ☐

The purpose of this survey is to identify areas of improvement in the team performance. The answers to the survey will be treated confidentially by a qualified person that is not professor at the ETSEQ. The team will receive a feedback report with the answers of all the members, including the team leader, but he/she will not be able to know who has answered what. Therefore, please, this is an opportunity to honestly help to identify those areas in which the team should work on to improve its performance.

To what extent do you agree with the following statements?

1. All the members of the team work in the project demonstrating a high level of commitment and energy.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

2. The level of collaboration between us is high.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

3. I trust the rest of team members.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

4. The level of communication in the team to carry-out the project activities is adequate.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

5. I am very satisfied with my project team.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

6. The team working methods are effective.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

7. The rest of the team members value and respect me.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

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8. Big part of the work in the project is being done by the same person or subgroup of people.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

9. Our team resolves conflicts in an open and constructive manner.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

10. In the team we say things to each other in a direct, honest, and respectful way.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

11. The team demonstrates a creative attitude and experiments with new ideas.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

12. The planification of the project planning has helped us in accomplishing the project objectives.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

13. We take good benefit of the weekly class hours that are designated to the project.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

14. The team regularly evaluates the effectiveness of the dynamics, methods, and the performance.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

15. I fully trust my team leader.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

16. My team leader acts like a personal or private professor.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

17. We are equally preoccupied to do a good project and to have good interaction among us.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

18. I am learning more and better with the project than with the individual and traditional class studies.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

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19. I am very clear about the reasons of doing the project.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

20. I am very aware of what is expected of me in my project team.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

21. I consider that my work is justly recognized by my team leader.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

22. I know the role of my team leader, what his/her responsibilities are and which ones are not.

Totally disagree	Mostly disagree	Somewhat disagree	Somewhat agree	Mostly agree	Totally agree

Could you point out ONE THING of the project that you have specially liked?

Could you point out ONE THING of the project that you have specially disliked?

Comments

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APPENDIX 3.4

FOCUS GROUP PROTOCOL AND QUESTIONS

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

1. **Datos de la sesión:**

Grupo observado	
Locutor 1	
Locutor 2	
Cámara	

Tabla 1.1. Datos correspondientes a la sesión de *focus on group*.

2. **Introducción:**

- En este apartado se realizará una pequeña introducción para suavizar el ambiente (2-3 minutos) y se explicará: qué se va hacer y qué se quiere conseguir.

"Hoy día ____ de Abril estamos en el aula _____ para realizar una sesión de focus group con el grupo _____. Como locutores participan _____ y _____, y grabando con la cámara_____ .

Hola, buenos días. Somos el equipo de Big Brothers and Little Sisters (¡Cómo si no nos hubieráis visto nunca! ¿No?), y como conocéis, nuestro trabajo se basa en realizar un seguimiento de cómo están actuando los alumnos de 4º en su rol de líder de un equipo de proyecto. Bien, pues primeramente queremos agradeceros vuestra participación en esta sesión de *focus group*, ésta no es más que una entrevista en grupo así que… ¡Nervios fuera! Queremos remarcaros lo importante que ésta resulta tanto para ellos como para nuestro equipo, para saber si nuestras observaciones se ajustan a la realidad. Cabe decir que es totalmente anónima y podéis expresaros con total libertad (aunque si algún líder paga bien por la información… ¡es broma!).

En la primera parte de la entrevista os realizaremos una serie de preguntas globales sobre vuestro líder, el *focus group* continua con cuestiones más concretas sobre vuestra relación con él, con estas preguntas queremos evaluar tanto vuestra relación profesional y personal con el líder como algunos aspectos un poco más técnicos. EL *focus group* concluirá con una serie de cuestiones para recoger vuestro punto de vista y vuestros deseos sobre la figura del líder

Bueno lo dicho, ¿qué os parece si empezamos? ¡Cuanto antes lo hagamos antes podréis abandonar este plató de televisión!"

¡NOTA!:

Se han preparado una serie de preguntas con el fin de ir un poco más allá, y de esta manera completar los datos obtenidos. Estas preguntas se encuentran entre paréntesis y sólo son sugerencias. En el anexo se presentan varias preguntas de este tipo que ayudaran a los locutores en el transcurso del focus group a indagar más según lo que contesten los miembros del equipo.

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3. Preguntas introductorias globales:

- Estas preguntas más generales servirán para romper el hielo.

- Antes de empezar a trabajar en el proyecto integrado de 1º-4º, ¿qué idea inicial teníais sobre el término líder? (¿Podéis ser más específicos?)

- ¿Cómo os sentisteis al enteraros de que esa figura estaría presente durante la ejecución de vuestro proyecto? (¿Tuvisteis alguna objeción?, ¿Qué es lo mejor/peor que pensasteis que podría pasar?)

4. Preguntas referentes a la relación con el líder:

- Una vez que los alumnos se sienten más cómodos, se realizarán preguntas con el fin de obtener datos de los entrevistados. También se busca que sean los alumnos quienes respondan por iniciativa propia al haberse (supuestamente) aclimatado al ritmo de la entrevista:

4.1. Trabajo en el proyecto

- ¿Podéis explicarnos qué responsabilidades asume vuestro líder en el proyecto? ¿Cómo actúa durante una semana estándar? ¿Qué funciones realiza vuestro líder durante la ejecución del proyecto?

- ¿Qué podríais decirnos sobre las competencias técnicas de vuestro líder? Dicho de otra manera, ¿Cómo describiríais la capacidad y la efectividad de vuestro líder en asumir sus responsabilidades?

- ¿Podéis explicarnos en qué medida se implica vuestro líder en el proyecto? ¿Sientes que se implica lo suficiente? (¿Qué habéis observado?)

- ¿Cómo te ha inspirado tu líder durante la ejecución del proyecto? ¿Supo transmitiros de una forma efectiva el objetivo y la importancia de realizar el proyecto? ¿Cómo lo hizo?

  - Durante la ejecución del proyecto, ¿Se ha visto alterado vuestro estado de ánimo? ¿El líder mostró interés por haceros sentir mejor? ¿Qué hizo?

4.2. Experiencia general

- ¿Qué habéis aprendido trabajando con vuestro líder?

  – ¿Cuál ha sido la aportación principal de tu líder al proyecto? (¿Alguien puede dar otra visión?)

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- ¿Qué es lo que más te gusta de trabajar con tu líder? (¿Cuántos pensáis de la misma manera? ¿Alguien difiere de estas opiniones?)
- ¿Qué es lo que menos te gusta de tu líder? ¿Cuáles son sus áreas de mejora? (¿Pensáis todos igual o alguien difiere?
- ¿Qué cosas ha hecho tu líder que hayan ayudado a mejorar el trabajo en el equipo? (¿Alguien tiene alguna sugerencia?)

4.3. Relación e interacción con el equipo

- ¿Cómo os sentís cuando interactuáis con vuestro líder?
  - ¿Te sientes cómodo?
  - ¿Cómo te ha inspirado tu líder durante la ejecución del proyecto?
  - ¿Ha sabido mantener esa motivación?
- Durante la ejecución del proyecto, ¿Cómo definiríais la actitud de vuestro líder? ¿Se muestra enérgico y optimista, o por el contrario, se muestra negativo y pesimista? ¿Cómo lo demuestra?
- ¿Sentís que vuestro líder os valora y os presta la suficiente atención cuando intervenís en las reuniones? ¿Cómo lo detectáis?
  - ¿Respeta vuestra opinión o impone su criterio?

4.4. Confianza con el líder

- ¿Hasta qué punto confiáis en vuestro líder?
- Cuando el líder os da su palabra sobre cualquier aspecto, ¿Se mantiene fiel a sus promesas? ¿Podríais poner un ejemplo de ese comportamiento?
- ¿Sientes al líder como un miembro más del equipo? (¿Cuántos pensáis igual?)
- ¿Creéis que es objetivo? ¿Notáis algún tipo de trato preferencial por parte del líder hacia alguno de vosotros o sentís que os trata a todos por igual? ¿En qué os basáis?

4.5. Feedback

- ¿Pensáis que vuestro líder os aporta el suficiente *feedback*? ¿Os gusta la manera en que vuestro líder os reporta *feedback*? ¿Cómo lo hace?

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- Vuestro líder, ¿os felicita por el trabajo bien hecho? ¿Cómo lo hace patente? Cuando está molesto con algo que habéis hecho mal, ¿Os hace notar su descontento? ¿Os gusta la forma que tiene de decirlo?

4.6. Conflictos

- ¿Han surgido conflictos a lo largo del proyecto? (¿Qué pasó?, ¿Cómo os sentisteis?, ¿Alguien más se sintió de la misma manera?)
  - ¿Qué motivó esos conflictos?
  - ¿Cómo actuó el líder en esos conflictos? ¿Se han resuelto?
  - ¿Crees que el líder hizo cuanto pudo para resolverlos?

5. Preguntas de clausura

- En este apartado se pretende concluir el *focus group* explorando los verdaderos deseos de los miembros en cuanto a la figura del líder.

- ¿Te gustaría volver a trabajar con tu líder en un futuro? ¿Por qué?
- Ahora imaginad que viajamos en el tiempo y que sois estudiantes de 4º año y tenéis que liderar a un equipo de proyecto de 1º, ¿Os gusta la idea? ¿Cómo actuaríais?
- Si pudierais cambiar algún aspecto del proyecto para hacerlo más eficiente, ¿Cual sería? (¿Qué habéis observado? ¿Qué sugerencias tenéis?)

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ANEXO:

A1. Preguntas indagatorias

- ¿Algún voluntario para dar su opinión? ¿Alguien más?
- ¿Estarías dispuesto a probar de explicarlo?
- ¿Podrías ser más específico?
- ¿Podrías decirlo de otra forma, con otras palabras?
- ¿Podrías dar alguna sugerencia?
- ¿Cómo te sientes sobre eso?
- ¿Qué preferirías?
- ¿Cuál es tu objeción?
- ¿Qué es lo mejor/peor?
- ¿Alguien puede añadir algo más?
- ¿Alguien tiene otra visión?
- ¿Alguien tiene otro punto de vista?
- ¿Podrías decir más cosas sobre este punto?

- "*Publishing phase*": los miembros del equipo han completado la experiencia, por tanto son preguntas para generar datos.
  - ¿Qué pasó?
  - ¿Cómo te sentiste?
  - ¿Quién más tuvo la misma experiencia?
  - ¿Quién reaccionó diferente?
  - ¿Hubo alguna sorpresa?
  - ¿Cuántos sentisteis lo mismo?
  - ¿Cuántos sentisteis algo diferente?
  - ¿Qué observasteis?
  - ¿De qué erais conscientes?

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- "*Processing phase*": Los miembros del equipo ya tienen esa información, por tanto las preguntas van enfocadas a dar sentido a los datos recogidos tanto individualmente como en equipo.

    - ¿Qué significado tuvo para ti?
    - ¿Cómo de importante fue?
    - ¿Cómo fue, bueno o malo?
    - ¿Cómo hubiera podido ser diferente?
    - ¿Observaste algún factor que pudo influir?
    - ¿Qué te sugiere esto tanto a nivel individual como a nivel de equipo?
    - ¿Qué cosas entiendes mejor sobre ti mismo y sobre el equipo?

- "*Generalizing phase*": los miembros del equipo han formado principios a partir de conocimientos específicos que han ganado tanto de ellos mismos como del trabajo en equipo, por lo que las preguntas van enfocadas en promover generalizaciones.

    - ¿Qué conclusiones extraéis sobre esto?
    - ¿Esto os lleva algún punto?
    - ¿Qué aprendisteis?
    - ¿Qué os sugiere esto así en general?
    - ¿Esto os hace recuerda a algo?
    - ¿Qué principio observáis que esté operando?
    - ¿Esto qué ayuda a explicar?
    - ¿Cómo puedes relacionar esto con otras experiencias?
    - ¿Qué asocias con eso?

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APPENDIX 3.5

The revised codebook to codify the learning journals and BEIs

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1-Commitment to Learning			
LEVEL 1	1.1	Strives to be competent	Looks for additional information, identifies and consults books, goes to extra courses (master, language, etc). Wants to do the job well, creates own standards of excellence, makes extra effort (works nights, weekends). Identifies areas of improvement for self, makes an effort to work on perceived difficulty, asks for help, uses advices or suggestions provided by others to improve the performance.
	1.2	Puts into practice everything that learns	
	1.3	Seeks feedback to improve performance	Is open and willing to receive feedback, accepts feedback in a positive manner, is ready to change and correct behaviour following the feedback and uses feedback to improve performance.
	1.4	Sees set-backs and errors as a chance to improve	
	1.5	Shares the knowledge and experience with others	
	1.6	Learns from own and others' mistakes, and experiences	
LEVE L 2	2.1	Provides a balanced view of members' strengths and weaknesses	Identifies key areas of improvement for members and their learning needs and monitors members' development. Uses strategies to identify the strengths of the team. Knows collective strengths of the team.
	2.2	Facilitates that the others learn to solve the problems on their own	Gives ideas about the possible reasons of error.
	2.3	Provides timely and constructive feedback for personal development	
	2.4	Asks insightful questions that facilitate learning and understanding	Helps members to enhance self-conscientiousness by making them reflect on what they are doing, why they are doing it that way. Makes others reflect on their mistakes and learn from them, Reflection about the past errors and future expectations. Gives examples of personal life experiences (errors, lessons learned.
	2.5	Calms others in new learning situations	Lets others make mistakes, and gives people the opportunity to fix mistakes without ``losing face", Calms others when they make mistake saying that it is normal to commit mistakes and help them correct their mistakes, Helps members to figure out their mistakes. Reassures and encourages.
	2.6	Is committed to enlisting support for members	Gives specific helpful information, advice, suggestion and practical support to members, resolves their doubts, and explains the task.
LEVEL 3	3.1	Helps others to discover their capacities and potentials	
	3.2	Encourages others to learn continuously from their activities as well as from others	
	3.3	Promotes that the others identify and share the best practices in the organization	
	3.4	Looks and proposes adequate challenges for personal development	
	3.5	Motivates others to exceed their own limits	

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2-Interpersonal Communication			
LEVEL 1	1.1	Interacts with others with an open and direct manner	
	1.2	Knows to listen actively being primarily preoccupied for understanding	Checks own assumptions. Invites conversations to shed light on issues
	1.3	Expresses ideas in a clear and concise manner	
	1.4	Ensures that the others understand the importance of what s/he is conveying	Checks back with the audience to clarify doubts.
	1.5	Make others feel valued when interacting with others	
LEVE L 2	2.1	Understands others' underlying needs, interests, problems, and motivations	Accurately interprets nonverbal behaviour and understands unspoken feelings.
	2.2	Systematically build consensus and support for his/her vision and focus	Finds mutually acceptable solutions.
	2.3	Presents logical and convincing arguments	Tells success stories of others and self. Makes others see the importance of what they are doing and how this will affect them.
	2.4	Convince others appealing to their interests	Knows how to approach others, assesses others' situation well to identify the best time to approach them, finds way of approaching others that does not make them become defensive, and understands how the chosen communication method impacts others. Predicts others' responses to get prepared.
	2.5	Demonstrates tact and diplomacy	Gives credits to others.
LEVEL 3	3.1	Is accessible to the others	
	3.2	Role-models	
	3.3	Describes a vision for the future that inspires others to work for it	
	3.4	Speaks with conviction and with an inspirational manner about the objective and importance of daily work	
	3.5	Interacts with others in a manner that increases their motivation	

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3-Drive for Excellence			
LEVEL 1	1.1	Demonstrates an open mind towards new concepts, ideas and methods	
	1.2	Challenges the status quo	
	1.3	Generates new ideas that add value	
	1.4	Participates in the activities	
	1.5	Recuperates easily	
LEVEL 2	2.1	Demonstrates a positive attitude to be able to do things	
	2.2	Facilitates that the others can generate ideas to make things better	
	2.3	Prioritizes the activities	
	2.4	Motivates others to participate in improvement activities	Implements others' innovative ideas. Fully supports others when they are implementing an innovative idea
	2.5	Runs calculated risks when implementing new ideas	
LEVEL 3	3.1	Provokes in others the desire to make things every time better	Makes others reflect on what they could have done better or differently.
	3.2	Promotes an environment of experimentation where people are not afraid to fail or take risks	
	3.3	Eliminates the obstacles interfering with the innovation in the organization	
	3.4	Impulse the others to share creative ideas inside and outside the organization	
	3.5	Recognizes others' creativity and innovation	

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4-Integrity			
LEVEL 1	1.1	Fulfils his/her promises to others	
	1.2	Expresses what s/he thinks and feels even knowing that the message will not well received by others	
	1.3	Does not criticize the people who are not present	
	1.4	Tells the truth	
	1.5	Assumes the responsibility of his/her actions, does not blame others	
LEVEL 2	2.1	Confronts immediately inappropriate behaviour	Makes members reflect on their behaviors
	2.2	Admits openly mistakes and errors	
	2.3	Treats others justly	
	2.4	Is ready to receive feedback about his/her behaviours towards other people	
	2.5	Acts to people who really corresponds to	
LEVEL 3	3.1	Is a role model for the demonstration of organizational values	Walks the talk
	3.2	Defends what s/he believes to be true and necessary even it might not be popular	
	3.3	Works for the well-being of the organization and the community	
	3.4	Answers the questions with good intentions	
	3.5	Can be trusted with confidential information	

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5-Results Orientation			
LEVEL 1	1.1	Works autonomously without continuous supervision	
	1.2	Identifies what needs to be done and acts without waiting before the situation or others requires it	Knows how to prioritize
	1.3	Persists to achieve objectives	
	1.4	Knows when s/he has a problem and acts immediately	
	1.5	Acts to avoid an imminent problem or to benefit from an immediate opportunity	
LEVE L 2	2.1	Establishes challenging achievable objectives	
	2.2	Conveys a sense of urge to finish the work or solve the problems	
	2.3	Provides constructive timely feedback	
	2.4	Confronts people with performance problems	States balance of consequences. Uses punishment to control behaviour. Makes others' reflect on individual and team performance and on the possible causes of performance problems to demonstrate unproductive behaviour. Addresses performance problems immediately and shows what is expected. Takes tough decisions (reducing staff, etc)
	2.5	Does not shy away to evaluate the work of others	
	2.6	Readily adjusts plans to achieve objectives	
	2.7	Manages performance	Maintains visible standards for performance, explains how the performance is evaluated, sets realistic deadline and established deadlines for the accomplishment with performance indicators. Personally and/or publicly monitors performance. Stays informed about progress and performance through both formal and informal methods (management by walking), monitors individual performance on a continuous basis. Solicits feedback from members about individual member performance. Monitors quality of others' work. Matches team members to tasks suited to their strengths. Effectively design work groups (depending on personality fit, motivation, etc) to get the work done. Questions others to assess their confidence in tackling a problem.
LEVEL 3	3.1	Demands high performance	
	3.2	Creates conditions that the others can work autonomously	
	3.3	Gives other liberty to decide how to do their work	Enables members to take ownership of their own work
	3.4	Facilitates that the others can learn from their honest mistakes in delegation	
	3.5	Gradually increases the responsibilities of others	

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6-Client Orientation			
LEVEL 1	1.1	Before acting, look to understand the needs and expectation of clients	
	1.2	Treats clients kindly and respectfully	
	1.3	Responds adequately to clients' questions, requests, and complaints	
	1.4	Establishes and maintains effective communication channels with clients	
	1.5	Follows up the clients' degree of satisfaction	
LEVE L 2	2.1	Keeps in mind the client when taking decisions	
	2.2	Encourages others' to achieve high levels of excellence in service to clients	
	2.3	Communicates with clients in a proactive, regular and systematic manner to determine their needs	
	2.4	Corrects rapidly the problems in client service without becoming defensive	
	2.5	Actively seeks to make things better for clients	
LEVEL 3	3.1	Promotes a climate oriented to clients	Encourages others to seek clients' needs. Encourages members to communicate with client
	3.2	Acts to serve for the clients' interests in the long term	
	3.3	Helps clients to identify the themes that concern the clients	
	3.4	Identify the tendencies in relation to client service	
	3.5	Gives recognition to those who demonstrates orientation to client	

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7-Responsiveness to Change			
LEVEL 1	1.1	Focuses on changes with a positive attitude	
	1.2	Adapts self rapidly to new situations	Adjusts behavior according to different personality types, preferences, motivation culture etc. Recognizes and understands that people are different.Tackles different problems with different approaches.
	1.3	Maintains quality work during times of change	
	1.4	Shares the feelings with others in time of change	
	1.5	Maintains calms and confident during periods of change	
LEVE L 2	2.1	Helps others to understand the reasons of change and how it will affect them	
	2.2	Considers the feelings of others in periods of change	
	2.3	Involve others in the planification of change implementation	
	2.4	Helps others to resolve their resistance to change	Helps members to understand and respect the right of others to have differing points of view Adjusts personal differences in team members.
	2.5	Demonstrates patience to complete the projects of change	
LEVEL 3	3.1	Identifies significant changes in the organization	
	3.2	Fosters frank conversation about the reasons of change	
	3.3	Transmits optimism about the positive out-comes of change	
	3.4	Conveys a sense of urge for the need to change	
	3.5	Helps others during times of change	

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8-Teamwork			
LEVEL 1	1.1	Demonstrates confidence and respect for others	Expresses confidence in others and expresses positive expectations, demonstrates confidence in others' judgements and decisions, gives others a second chance, demonstrates trust in the good intentions of other people. Instils confidence in others and foster their confidence by stating his/her trust in their ability to do things.
	1.2	Ensures that the others does not suffer from the lack of quality in his own work	
	1.3	Shares all the relevant information with others	
	1.4	Offers his/her help when the others need it	
	1.5	Is ready to make personal sacrifices to reach the team objectives	
LEVE L 2	2.1	Creates an atmosphere of mutual trust and confidence and respect	Makes members to trust to each other. Builds emotional attachment for the team. Creates the team identity and team spirit.
	2.2	Ensures that the others have clear objectives, expectations and responsibilities	Adjusts objectives depending on team's stage. Keeps members informed about the progress and problems. Ensures that all the members are updated. Ensures that each member has clear understanding project tasks carried out by other members of the team. Ensures that the work load is distributed equally.
	2.3	Involves others in the elaboration of plans of acts	
	2.4	Confronts conflicts in the team in a timely and constructive manner	Gives members' feedback about member behaviour. Personally investigates the causes of conflicts. Makes others see the where they are going with the current attitude of the team. Makes members reflect on the team and its functioning. Reminds team norms.
	2.5	Gives recognition to the contribution of others	
	2.6	Facilitates the meeting	Avoids dominating the discussion. Adds/eliminates roles for the meeting. Clarifies roles for the meeting. Guides the process. Summarizes. Gets prepared for the meeting. Asks questions to ensure participation. Encourages less participative members.
	2.7	Promotes communication in the team	Ensures that regular consistent communication takes place.
	2.8	Assesses and selects appropriate approach to lead	Selects the most appropriate behaviour according to situation and the demands of the situation. Promptly changes behaviour when recognizes that his/her behaviour is not effective. Takes the leading style decision based on cost effect analysis. Acts within the limits of own authority.
	2.9	Positions self as the leader	Is enthusiastic about realizing the leader role and is enthusiastic to serve people. Takes responsibility for team success. Assesses and understands how own behaviour affects the team, its functioning and team member behaviour.
	2.10	Demonstrates caring leadership	Cares the well-being of the team. Is concerned with motivating people (promptly identifies motivational problems), individually communicates with members to motivate them, motivates others taken into consideration their interests, needs, etc, knows how to motivate the members or not to demotivate, investigates members' level of satisfaction, understand members' need and responds constructively to the needs of members, takes care of the feelings of members. Is genuinely interested in team and members, gets to know the members' individually (their expectations, feelings), and thinks in the best interest of members. Knows members, past relationship between each other. Is sensitive to the members' problems and personally investigates members' problems, immediately acts on to understand members' problems and concerns, promptly tackles members' problems, demonstrates preoccupation for members' problems and provides help to solve them. Shows commitment by being personally present and involved at key events, works with the team in the difficult stressful times, helps members in tough times.
LEVEL 3	3.1	Maintains good relationships	
	3.2	Promotes collaboration in between different teams of the organization	
	3.3	Eliminates barriers to effective team functioning	
	3.4	Actively looks for collaboration with other organizations	
	3.5	Recognizes the teams that has established alliances	

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APPENDIX 3.6

NUMBERS THAT WERE ASSIGNED TO EACH ONE OF THE BEHAVIOURS IN THE CODE BOOK

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COMPETENCY	CODE	DESCRIPTOR
COMMITMENT TO LEARNING	111	Strives to be competent
	112	Puts into practice everything that s/he learns
	113	Seeks feedback to improve performance
	114	Sees set-backs and errors as a chance to improve
	115	Shares the knowledge and experience with others
	116	Learns from own and others' mistakes, and experiences
	121	Provides a balanced view of members' strengths and weaknesses
	122	Facilitates that the others learn to solve the problems on their own
	123	Provides timely and constructive feedback for personal development
	124	Asks insightful questions that facilitate learning and understanding
	125	Calms others in new learning situations
	126	Is committed to enlisting support for members
	131	Helps others to discover their capacities and potentials
	132	Encourages others to learn continuously from their activities as well as from others
	133	Promotes that the others identify and share the best practices in the organization
	134	Looks and proposes adequate challenges for personal development
	135	Motivates others to exceed their own limits
INTERPERSONAL COMMUNICATION	211	Interacts with others with an open and direct manner
	212	Knows to listen actively being primarily preoccupied for understanding
	213	Expresses ideas in a clear and concise manner
	214	Ensures that the others understand the importance of what s/he is conveying
	215	Make others feel valued when interacting with others
	221	Understands others' underlying needs, interests, problems, and motivations
	222	Systematically builds consensus and support for his/her vision and focus
	223	Presents logical and convincing arguments
	224	Convince others appealing to their interests
	225	Demonstrates tact and diplomacy
	231	Is accessible to the others
	232	Role-models
	233	Describes a vision for the future that inspires others to work for it
	234	Speaks with conviction and with an inspirational manner about the objective and importance of daily work
	235	Interacts with others in a manner that increases their motivation

ISBN:978-84-693-5423-0/DL:T-1414-2010

Competency	CODE	DESCRIPTOR
DRIVE FOR EXCELLENCE	311	Demonstrates an open mind towards new concepts, ideas and methods
	312	Challenges the status quo
	313	Generates new ideas that add value
	314	Participates in the activities
	315	Recuperates easily
	321	Demonstrates a positive attitude to be able to do things
	322	Facilitates that the others can generate ideas to make things better
	323	Prioritizes the activities
	324	Motivates others to participate in improvement activities
	325	Runs calculated risks when implementing new ideas
	331	Provokes in others the desire to make things every time better
	332	Promotes an environment of experimentation where people are not afraid to fail or take risks
	333	Eliminates the obstacles interfering with the innovation in the organization
	334	Impulse the others to share creative ideas inside and outside the organization
	335	Recognizes others' creativity and innovation
INTEGRITY	411	Fulfils his/her promises to others
	412	Expresses what s/he thinks and feels even knowing that the message will not well received by others
	413	Does not criticize the people who are not present
	414	Tells the truth
	415	Assumes the responsibility of his/her actions, does not blame others
	421	Confronts immediately inappropriate behaviour
	422	Admits openly mistakes and errors
	423	Treats others justly
	424	Is ready to receive feedback about his/her behaviours towards other people
	425	Acts to people who really corresponds to
	431	Is a role model for the demonstration of organizational values
	432	Defends what s/he believes to be true and necessary even it might not be popular
	433	Works for the well-being of the organization and the community
	434	Answers the questions with good intentions
	435	Can be trusted with confidential information

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Competency	CODE	DESCRIPTOR
RESULTS ORIENTATION	511	Works autonomously without continuous supervision
	512	Identifies what needs to be done and acts without waiting before the situation or others requires it
	513	Persists to achieve objectives
	514	Knows when s/he has a problem and acts immediately
	515	Acts to avoid an imminent problem or to benefit from an immediate opportunity
	521	Establishes challenging achievable objectives
	522	Conveys a sense of urge to finish the work or solve the problems
	523	Provides constructive timely feedback
	524	Confronts people with performance problems
	525	Does not shy away to evaluate the work of others
	526	Readily adjusts plans to achieve objectives
	527	Manages performance
	531	Demands high performance
	532	Creates conditions that the others can work autonomously
	533	Gives other liberty to decide how to do their work
	534	Facilitates that the others can learn from their honest mistakes in delegation
	535	Gradually increases the responsibilities of others
CLIENT ORIENTATION	611	Before acting, look to understand the needs and expectation of clients
	612	Treats clients kindly and respectfully
	613	Responds adequately to clients' questions, requests, and complaints
	614	Establishes and maintains effective communication channels with clients
	615	Follows up the clients' degree of satisfaction
	621	Keeps in mind the client when taking decisions
	622	Encourages others' to achieve high levels of excellence in service to clients
	623	Communicates with clients in a proactive, regular and systematic manner to determine their needs
	624	Corrects rapidly the problems in client service without becoming defensive
	625	Actively seeks to make things better for clients
	631	Promotes a climate oriented to clients
	632	Acts to serve for the clients' interests in the long term
	633	Helps clients to identify the themes that concern the clients
	634	Identify the tendencies in relation to client service
	635	Gives recognition to those who demonstrates orientation to client

UNIVERSITAT ROVIRA I VIRGILI
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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

ompetency	CODE	DESCRIPTOR
RESPONSIVENESS TO CHANGE	711	Focuses on changes with a positive attitude
	712	Adapts self rapidly to new situations
	713	Maintains quality work during times of change
	714	Shares the feelings with others in time of change
	715	Maintains calms and confident during periods of change
	721	Helps others to understand the reasons of change and how it will affect them
	722	Considers the feelings of others in periods of change
	723	Involve others in the planification of change implementation
	724	Helps others to resolve their resistance to change
	725	Demonstrates patience to complete the projects of change
	731	Identifies significant changes in the organization
	732	Fosters frank conversation about the reasons of change
	733	Transmits optimism about the positive out-comes of change
	734	Conveys a sense of urge for the need to change
	735	Helps others during times of change
TEAMWORK	811	Demonstrates confidence and respect for others
	812	Ensures that the others does not suffer from the lack of quality in his own work
	813	Shares all the relevant information with others
	814	Offers his/her help when the others need it
	815	Is ready to make personal sacrifices to reach the team objectives
	821	Creates an atmosphere of mutual trust and confidence and respect
	822	Ensures that the others have clear objectives, expectations and responsibilities
	823	Involves others in the elaboration of plans of acts
	824	Confronts conflicts in the team in a timely and constructive manner
	825	Gives recognition to the contribution of others
	826	Facilitates the meeting
	827	Promotes communication in the team
	828	Assesses and selects appropriate approach to lead
	829	Positions self as the leader
	8210	Demonstrates caring leadership
	8211	Uses strategies to promote team effectiveness
	831	Maintains good relationships
	832	Promotes collaboration in between different teams of the organization
	833	Eliminates barriers to effective team functioning
	834	Actively looks for collaboration with other organizations
	835	Recognizes the teams that has established alliances

UNIVERSITAT ROVIRA I VIRGILI
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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

APPENDIX 3.7

CATEGORIZATION OF PROJECT TEAMS BASED ON BELBIN'S BASIC CONCEPT

("0" = Unbalanced team, "1" = Balanced Team"; highlighted are the primary and secondary team role preferences)

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

ISBN:978-84-693-5423-0/DL:T-1414-2010

Team	Belbin	Leader	M1	M2	M3	M4	M5	M6	M7	Team Balance
1	IMP	**14**	5	**10**	**15**	**13.5**	**13**	9		0
	CO	4	11	**11**	**11**	7	9	6		
	SH	**19**	7	**10**	7	7	**12**	**10.5**		
	PL	3	**13**	7	**11**	7	3	6		
	RI	6	9	6	4	5.5	8	8.5		
	ME	10	7	**11**	9	**13**	6	10		
	TW	2	**12**	8	3	7	**12**	8.5		
	CF	12	6	7	10	10	7	**11.5**		
2	IMP	**17**	9.5	7	**11.8**	**13**				0
	CO	**13**	2.5	**13**	7.75	**13**				
	SH	5	4.25	7	**11**	**11**				
	PL	5	4	**11**	6.5	7				
	RI	6	7.75	**13**	8.5	7				
	ME	9	7.5	7	6	8				
	TW	8	**15.3**	9	8.5	6				
	CF	7	**19.3**	3	10	5				
3	IMP	**15**	9	**12**	8	**11**	14			0
	CO	7	3	10	7	4	0			
	SH	**18**	5	9	4	7	3			
	PL	4	11	5	**11**	7	**15**			
	RI	1	7	8.2	8	**12**	10			
	ME	7	**12**	5.8	9	7	**18**			
	TW	10	**14**	8.6	**13**	10	10			
	CF	8	9	**11**	10	**12**	0			
4	IMP	11	**14**	7	**17**	10	**9**			0
	CO	**12**	3	8	12	2.5	**11**			
	SH	**14**	12	**16**	4	4	**9**			
	PL	5	2	6	3	4.5	7			
	RI	10	3	6	7	7	6			
	ME	5	**19**	6	6	7.75	8			
	TW	6	7	9	**13**	**15.25**	**9**			
	CF	7	10	**12**	8	**19**	**11**			
5	IMP	**14**	11	10	**18**	5	**13**			0
	CO	10	0	7	3	**13.33**	**13**			
	SH	3	6	8	7	**14.33**	9			
	PL	4	**14**	**12**	**11**	12	2			
	RI	6	1	7	10	10.5	9			
	ME	10	13	**11**	10	0.5	5			
	TW	**13**	**15**	4	7	2	**12**			
	CF	10	10	**11**	4	12.33	7			

ISBN:978-84-693-5423-0/DL:T-1414-2010

Team	Belbin	Leader	M1	M2	M3	M4	M5	M6	M7	Belbin Concept
6	IMP	6	**17**	**9.4**	7	7				1
	CO	**12**	8	**11**	8.2	**14**				
	SH	**16**	5	7	**10**	6				
	PL	2	3	6.8	**10**	6				
	RI	6	8	**9.4**	**12**	5				
	ME	11	8	**11**	8.1	7				
	TW	10	**12**	8.1	8.2	12				
	CF	7	9	7.4	5.9	**13**				
7	IMP	8	**12**	5	10	13	**13**			0
	CO	6	8	2	7	2	1			
	SH	7	7	11	8	**16**	5			
	PL	8	6	**12**	4	5	7			
	RI	4	8	9	7	**15**	8			
	ME	5	**11**	2	**11**	8	**15**			
	TW	**13**	9	**12**	**16**	2	12			
	CF	**19**	9	**17**	7	9	9			
8	IMP	**9**	9	**15**	**10**	8	7			1
	CO	**12**	**11**	8	4	8	4			
	SH	**12**	9	8	**10**	5	2			
	PL	**12**	7	5	**8**	**13**	**11**			
	RI	3	8	6	6	8	**11**			
	ME	5	4	8	9	6	**11**			
	TW	**12**	**15**	8	8	7	**15**			
	CF	4	7	**12**	5	**15**	9			
9	IMP	**11**	8	**14**	**15**	**11**				0
	CO	8	5	1	7	10				
	SH	**12**	7	**14**	11	**13**				
	PL	8	**12**	1	4	5				
	RI	7	8	4	4	7				
	ME	10	3	6	7	5				
	TW	7	**21**	8	8	**11**				
	CF	7	6	**22**	**14**	8				
10	IMP	10	5	4	14	10	**17**			0
	CO	**11**	**16**	6	8	6	7			
	SH	**17**	10	5	3	**11**	**10**			
	PL	9	6	7	3	6	3			
	RI	8	**15**	9	6	6	7			
	ME	6	2	6	**19**	10	**10**			
	TW	3	11	**23**	2	7	6			
	CF	6	5	**10**	**15**	**14**	**10**			

ISBN:978-84-693-5423-0/DL:T-1414-2010

Team	Belbin	Leader	M1	M2	M3	M4	M5	M6	M7	Belbin Concept
11	IMP	**10**	8	**1**	9	9	**11**			1
	CO	**12**	2	9	5	9	6			
	SH	5	1	7	10	**19**	9			
	PL	6	**25**	4	7	8	7			
	RI	**10**	0	5	10	**13**	5			
	ME	9	**19**	**11**	**16**	4	9			
	TW	6	10	**12**	**11**	4	**12**			
	CF	**12**	5	10	2	4	**11**			
12	IMP	11	0	9	**12**	10	**12**			0
	CO	2	11	**10**	8	7	9			
	SH	**13**	6	8	**11**	10	5			
	PL	11	**23**	8	2	4	7			
	RI	4	4	7	7	10	6			
	ME	6	7	9	**12**	**11**	**12**			
	TW	3	**14**	**13**	8	**12**	8			
	CF	**20**	5	6	10	4	**11**			
13	IMP	6	7	**15**	**12**	9				0
	CO	**17**	9	5	8	7				
	SH	**16**	8	8	**12**	**12**				
	PL	2	**10**	4	7	6				
	RI	1	9	2	**12**	8				
	ME	14	7	11	2	8				
	TW	7	**12**	9	8	5				
	CF	7	8	**16**	**9**	**15**				
14	IMP	**17**	6	**11**	7	9	**10**			0
	CO	**19**	3	5	11	5	**10**			
	SH	9	7	9	**12**	5	7			
	PL	4	13	8	10	9	7			
	RI	4	5	10	4	7	9			
	ME	12	6	9	7	6	6			
	TW	2	**14**	**12**	6	**15**	**13**			
	CF	3	**16**	6	**13**	**14**	8			
15	IMP	**16**	**13**	**15**	11	6	**18**			0
	CO	11	10	7	**13**	**12**	4			
	SH	**12**	3	9	**13**	6	8			
	PL	2	9	2	8	**11**	2			
	RI	5	4	6	7	10	5			
	ME	6	12	7	**12**	**11**	11			
	TW	10	**14**	8	3	8	**15**			
	CF	8	5	**16**	3	6	7			
16	IMP	**13**	9	**14**	**13**	3	**12**			0
	CO	11	7	4	7	7	7			
	SH	**13**	9	6	3	**37**	5			
	PL	3	**10**	7	8	2	8			
	RI	5	9	6	8	4	6			
	ME	4	7	6	**12**	3	**11**			
	TW	9	**12**	7	7	1	10			
	CF	**12**	7	**20**	**12**	**13**	**11**			

ISBN:978-84-693-5423-0/DL:T-1414-2010

Team	Belbin	Leader	M1	M2	M3	M4	M5	M6	M7	Belbin Concept
17	IMP	**14**	**17**	10	11	**13**	**9**			0
	CO	8	7	4	0	4	8			
	SH	**23**	9	6	10	8	**25**			
	PL	3	12	5	**12**	9	6			
	RI	4	2	12	4	**10**	4			
	ME	3	7	2	**25**	**10**	7			
	TW	5	**14**	**13**	2	6	**9**			
	CF	10	4	**18**	6	**10**	2			
18	IMP	2	**16**	8	6	12	**12**	**16**	**20**	0
	CO	6	8	0	7	11	5	6	9	
	SH	**16**	8	5	**11**	**20**	2	**12**	1	
	PL	**27**	1	0	6	3	**13**	9	11	
	RI	8	12	**13**	9	**14**	5	4	2	
	ME	8	7	**13**	**14**	2	9	11	8	
	TW	3	**15**	**24**	10	7	11	8	**16**	
	CF	0	3	7	7	1	**13**	4	3	

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

APPENDIX 3.8

CATEGORIZATION OF PROJECT TEAMS BASED ON SENIOR'S FIRST MEASURE

("0" = Unbalanced team, "1" = Balanced Team"; highlighted are highlighted are the team roles represented at or above 70)

UNIVERSITAT ROVIRA I VIRGILI
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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

ISBN:978-84-693-5423-0/DL:T-1414-2010

T	Res.	IMP	CO	SH	PL	RI	ME	TW	CF	Balance
1	L	**80.77**	17.05	**97.04**	17.12	34.28	63.05	3.65	**73.32**	1
	M1	5.51	**80.37**	31.17	**88.93**	**71.63**	33.41	**72.71**	23.61	
	M2	41.03	**80.37**	54.11	46.79	34.28	**72.14**	36.14	31.02	
	M3	**87.36**	**80.37**	31.17	**78.48**	14.55	53.15	6.02	56.96	
	M4	**76.81**	42.95	31.17	46.79	28.52	**86.32**	27.61	56.96	
	M5	**72.43**	63.25	69.13	17.12	59.73	24.74	**72.71**	31.02	
	M6	30.83	33.15	58.02	38.30	65.87	63.05	40.71	69.52	
2	L	**95.47**	**91.48**	18.74	30.33	34.28	53.15	36.14	31.02	0
	M1	35.80	9.03	15.01	23.21	56.55	38.14	**91.67**	**98.76**	
	M2	14.71	**91.48**	31.17	**78.48**	**96.95**	33.41	45.42	8.23	
	M3	59.98	50.64	61.85	42.50	65.87	24.74	40.71	56.96	
	M4	**72.43**	**91.48**	61.85	46.79	46.84	43.06	20.21	17.30	
3	L	**87.36**	42.95	**95.43**	23.21	2.11	33.41	54.96	39.29	1
	M1	30.83	11.31	18.74	**78.48**	46.84	**79.98**	**86.07**	48.07	
	M2	57.32	**75.80**	46.22	30.33	62.23	23.17	41.65	68.73	
	M3	21.92	42.95	13.88	**78.48**	59.73	53.15	**80.06**	56.96	
	M4	51.89	17.05	31.17	46.79	**93.92**	33.41	54.96	**73.32**	
	M5	**80.77**	2.36	9.96	**95.13**	**81.52**	**99.10**	54.96	1.97	
4	L	51.89	**86.71**	**81.48**	30.33	**81.52**	17.45	20.21	31.02	0
	M1	**80.77**	11.31	69.13	12.17	8.36	**99.56**	27.61	56.96	
	M2	14.71	53.21	**90.19**	38.30	34.28	24.74	45.42	**73.32**	
	M3	**95.47**	**86.71**	13.88	17.12	46.84	24.74	**80.06**	39.29	
	M4	41.03	9.03	13.88	26.65	46.84	40.58	**91.67**	**98.56**	
	M5	30.83	**80.37**	46.22	46.79	34.28	43.06	45.42	65.50	
5	L	**80.77**	**72.46**	9.96	23.21	34.28	63.05	**80.06**	56.96	1
	M1	51.89	2.36	24.53	**92.51**	2.11	**86.32**	**90.71**	56.96	
	M2	41.03	42.95	38.48	**84.27**	46.84	**72.14**	9.45	65.50	
	M3	**97.53**	11.31	31.17	**78.48**	**81.52**	63.05	27.61	12.18	
	M4	5.51	**92.73**	**83.18**	**84.27**	**85.54**	1.88	3.65	**75.69**	
	M5	**72.43**	**91.48**	46.22	12.17	**71.63**	17.45	**72.71**	31.02	
6	L	9.29	**86.71**	**90.19**	12.17	34.28	**72.14**	54.96	31.02	1
	M1	**95.47**	53.21	18.74	17.12	59.73	43.06	**72.71**	48.07	
	M2	34.78	**80.37**	31.17	45.07	**75.87**	**71.28**	37.04	34.24	
	M3	14.71	55.25	54.11	**71.61**	**95.94**	44.06	37.95	22.92	
	M4	14.71	**94.84**	24.53	38.30	23.26	33.41	**72.71**	**80.12**	

ISBN:978-84-693-5423-0/DL:T-1414-2010

T	Res.	IMP	CO	SH	PL	RI	ME	TW	CF	Balance
7	L	21.92	33.15	31.17	55.44	14.55	17.45	**80.06**	**98.56**	0
	M1	62.61	53.21	31.17	38.30	59.73	**72.14**	45.42	48.07	
	M2	5.51	7.10	61.85	**84.27**	**71.63**	4.47	**72.71**	**95.91**	
	M3	41.03	42.95	38.48	23.21	46.84	**72.14**	**94.10**	31.02	
	M4	**72.43**	7.10	**90.19**	30.33	**99.42**	43.06	3.65	48.07	
	M5	**72.43**	4.21	18.74	46.79	59.73	**94.55**	**72.71**	48.07	
8	L	30.83	**86.71**	69.13	**84.27**	8.36	17.45	**72.71**	12.18	0
	M1	30.83	**80.37**	46.22	46.79	59.73	11.69	**90.71**	31.02	
	M2	**87.36**	53.21	38.48	30.33	34.28	43.06	36.14	**73.32**	
	M3	41.03	17.05	54.11	**98.95**	34.28	53.15	36.14	17.30	
	M4	21.92	53.21	18.74	**88.93**	59.73	24.74	27.61	**90.20**	
	M5	14.71	17.05	6.92	**78.48**	**88.93**	**72.14**	**90.71**	48.07	
9	L	51.89	53.21	69.13	55.44	46.84	63.05	27.61	31.02	0
	M1	21.92	24.39	31.17	**84.27**	59.73	7.43	**99.71**	23.61	
	M2	**80.77**	4.21	**81.48**	8.32	14.55	24.74	36.14	**99.79**	
	M3	**87.36**	42.95	61.85	23.21	14.55	33.41	36.14	**85.76**	
	M4	51.89	**72.46**	**75.73**	30.33	46.84	17.45	64.22	39.29	
10	L	41.03	**80.37**	**93.19**	63.83	59.73	24.74	6.02	23.61	0
	M1	5.51	**98.40**	54.11	38.30	**99.42**	4.47	64.22	17.30	
	M2	3.07	33.15	18.74	46.79	**71.63**	24.74	**99.94**	56.96	
	M3	**80.77**	53.21	9.96	17.12	34.28	**99.56**	3.65	**90.20**	
	M4	41.03	33.15	61.85	38.30	34.28	63.05	27.61	**85.76**	
	M5	**95.47**	42.95	54.11	17.12	46.84	63.05	20.21	56.96	
11	L	41.03	**86.71**	18.74	38.30	**81.52**	53.15	20.21	**73.32**	0
	M1	21.92	7.10	4.65	**99.99**	0.92	**99.56**	54.96	17.30	
	M2	62.61	63.25	31.17	23.21	23.26	**72.14**	**72.71**	56.96	
	M3	30.83	24.39	54.11	46.79	**81.52**	**96.83**	64.22	5.33	
	M4	30.83	63.25	**97.04**	55.44	**96.95**	11.69	9.45	12.18	
	M5	51.89	33.15	46.22	46.79	23.26	53.15	**72.71**	65.50	
12	L	51.89	7.10	**75.73**	**78.48**	14.55	24.74	6.02	**99.20**	0
	M1	0.15	**80.37**	24.53	**99.97**	14.55	33.41	**86.07**	17.30	
	M2	30.83	**72.46**	38.48	55.44	46.84	53.15	**80.06**	23.61	
	M3	62.61	53.21	61.85	12.17	46.84	**79.98**	36.14	56.96	
	M4	41.03	42.95	54.11	23.21	**81.52**	**72.14**	**72.71**	12.18	
	M5	62.61	63.25	18.74	46.79	34.28	**79.98**	36.14	65.50	
13	L	20.06	**71.07**	**79.66**	25.23	30.92	67.10	20.87	60.61	1
	M1	14.71	63.25	38.48	**71.61**	**71.63**	33.41	**72.71**	39.29	
	M2	**87.36**	24.39	38.48	23.21	4.39	**72.14**	45.42	**93.53**	
	M3	62.61	53.21	69.13	46.79	93.92	4.47	36.14	48.07	
	M4	30.83	42.95	69.13	38.30	59.73	43.06	14.14	**90.20**	

ISBN:978-84-693-5423-0/DL:T-1414-2010

T	Res.	IMP	CO	SH	PL	RI	ME	TW	CF	Balance
14	L	**95.47**	**99.82**	46.22	23.21	14.55	**79.98**	3.65	8.23	0
	M1	9.29	11.31	31.17	**88.93**	23.26	24.74	**86.07**	**93.53**	
	M2	51.89	24.39	46.22	55.44	**81.52**	53.15	**72.71**	23.61	
	M3	14.71	**80.37**	69.13	**71.61**	14.55	33.41	20.21	**80.12**	
	M4	30.83	24.39	18.74	63.83	46.84	24.74	**90.71**	**85.76**	
	M5	41.03	**72.46**	31.17	46.79	**71.63**	24.74	**80.06**	39.29	
15	L	**92.19**	**80.37**	69.13	12.17	23.26	24.74	54.96	39.29	1
	M1	**72.43**	**72.46**	9.96	63.83	14.55	**79.98**	**86.07**	17.30	
	M2	**87.36**	42.95	46.22	12.17	34.28	33.41	36.14	**93.53**	
	M3	51.89	**91.48**	**75.73**	55.44	46.84	**79.98**	6.02	8.23	
	M4	9.29	**86.71**	24.53	**78.48**	**81.52**	**72.14**	36.14	23.61	
	M5	**97.53**	17.05	38.48	12.17	23.26	**72.14**	**90.71**	31.02	
16	L	**72.43**	**80.37**	**75.73**	17.12	23.26	11.69	45.42	**73.32**	1
	M1	30.83	42.95	46.22	**71.61**	**71.63**	33.41	**72.71**	31.02	
	M2	**80.77**	17.05	24.53	46.79	34.28	24.74	27.61	**99.20**	
	M3	**72.43**	42.95	9.96	55.44	59.73	**79.98**	27.61	**73.32**	
	M4	1.60	42.95	**100.00**	12.17	14.55	7.43	2.10	**80.12**	
	M5	62.61	42.95	18.74	55.44	34.28	**72.14**	54.96	65.50	
17	L	**80.77**	53.21	**99.63**	17.12	14.55	7.43	14.14	56.96	0
	M1	**95.47**	42.95	46.22	**84.27**	4.39	33.41	**86.07**	12.18	
	M2	41.03	17.05	24.53	30.33	**93.92**	4.47	**80.06**	**97.52**	
	M3	51.89	2.36	54.11	**84.27**	14.55	**100.00**	3.65	23.61	
	M4	**72.43**	17.05	38.48	63.83	**81.52**	63.05	20.21	56.96	
	M5	30.83	53.21	**99.90**	38.30	14.55	33.41	45.42	5.33	
18	L	0.78	33.15	**90.19**	**100.00**	59.73	43.06	6.02	1.97	1
	M1	**92.19**	53.21	38.48	8.32	**93.92**	33.41	**90.71**	8.23	
	M2	21.92	2.36	18.74	5.47	**96.95**	**86.32**	**99.98**	31.02	
	M3	9.29	42.95	61.85	38.30	**71.63**	**91.13**	54.96	31.02	
	M4	62.61	**80.37**	**98.15**	17.12	**98.61**	4.47	27.61	3.31	
	M5	62.61	24.39	6.92	**88.93**	23.26	53.15	64.22	**80.12**	
	M6	**92.19**	33.15	69.13	63.83	14.55	**72.14**	36.14	12.18	
	M7	**99.40**	63.25	4.65	**78.48**	4.39	43.06	**94.**10	8.23	

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APPENDIX 3.9

CATEGORIZATION OF PROJECT TEAMS BASED ON SENIOR'S SECOND MEASURE: POINT VARIANCE BETWEEN THE AVERAGE TEAM ROLE SCORES

("0" = Unbalanced team, "1" = Balanced Team"; highlighted are highlighted are the team roles represented at or above 70)

UNIVERSITAT ROVIRA I VIRGILI
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T	IMP	CO	SH	PL	RI	ME	TW	CF	Variation	Balance
1	56.39	56.79	53.12	47.65	44.12	56.55	37.08	48.92	19.71	1
2	55.68	66.82	37.72	44.26	60.10	38.50	46.83	42.45	29.10	0
3	55.02	32.07	35.90	58.74	57.73	53.70	62.11	48.06	30.04	0
4	52.45	54.56	52.46	28.56	42.02	41.69	51.73	60.78	32.22	0
5	58.19	52.22	38.92	62.49	53.65	50.65	47.37	49.72	23.56	0
6	33.79	74.08	43.75	36.85	57.82	52.79	55.07	43.27	40.28	0
7	45.99	24.62	45.27	46.39	58.65	50.64	61.44	61.62	37.00	0
8	37.78	51.27	38.93	71.29	47.55	37.04	59.00	45.35	34.25	0
9	58.77	39.44	63.87	40.31	36.50	29.22	52.76	55.89	34.66	0
10	44.48	56.87	48.66	36.91	57.70	46.60	36.94	55.13	20.79	1
11	39.85	46.31	41.99	51.75	51.24	64.42	49.04	38.43	25.99	0
12	41.52	53.22	45.57	52.68	39.76	57.23	52.86	45.79	17.47	1
13	46.19	52.98	56.44	41.71	50.22	44.28	43.79	60.38	18.67	1
14	40.54	52.12	40.44	58.30	42.06	40.13	58.90	55.09	18.78	1
15	68.45	65.17	44.01	39.04	37.29	60.40	51.67	35.50	32.95	0
16	53.45	44.87	45.86	43.10	39.62	38.23	38.40	70.41	32.18	0
17	62.07	30.97	60.48	53.02	37.25	40.30	41.59	42.09	31.10	0
18	55.12	41.60	48.51	50.06	57.88	53.34	59.22	22.01	37.21	0

Variation = Highest Average Score- Smallest Average Score

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APPENDIX 3.10

WON-WOO AND HOJIN'S MEASURE

Team roles represented at 70-score. 80-score and 90-score criterion in each project team

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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T	70-score	80-score	90-score
1	6	4	1
2	2	0	5
3	4	3	4
4	1	5	5
5	7	6	4
6	4	2	4
7	4	2	4
8	4	4	3
9	2	4	2
10	1	3	7
11	3	2	4
12	5	3	2
13	6	1	1
14	4	5	4
15	5	4	4
16	7	3	1
17	1	4	4
18	3	4	5

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ISBN:978-84-693-5423-0/DL:T-1414-2010

APPENDIX 3.11

FIRST TEAM BALANCE INDEX (TBI1) OF PARTINGTON AND HARRIS

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

T	Role	L	M1	M2	M3	M4	M5	M6	M7	Role Mean	Deviation from 8.75	Total SD	TBI1 (%)
1	IMP	14	5	10	15	14	13	9		11.36	2.61	10.43	43.41
	CO	4	11	11	11	7	9	6		8.43	0.32		
	SH	19	7	10	7	7	12	10.5		10.36	1.61		
	PL	3	13	7	11	7	3	6		7.14	1.61		
	RI	6	9	6	4	5.5	8	8.5		6.71	2.04		
	ME	10	7	11	9	13	6	10		9.43	0.68		
	TW	2	12	8	3	7	12	8.5		7.50	1.25		
	CF	12	6	7	10	10	7	11.5		9.07	0.32		
2	IMP	17	9.5	7	12	13				11.65	2.90	9.40	45.98
	CO	13	2.5	13	7.8	13				9.85	1.10		
	SH	5	4.3	7	11	11				7.65	1.10		
	PL	5	4	11	6.5	7				6.70	2.05		
	RI	6	7.8	13	8.5	7				8.45	0.30		
	ME	9	7.5	7	6	8				7.50	1.25		
	TW	8	15	9	8.5	6				9.35	0.60		
	CF	7	19	3	10	5				8.85	0.10		
3	IMP	15	9	12	8	11	14			11.42	2.67	11.98	40.03
	CO	7	3	10	7	4	0			5.23	3.52		
	SH	18	5	9	4	7	3			7.67	1.08		
	PL	4	11	5	11	7	15			8.83	0.08		
	RI	1	7	8.2	8	12	10			7.70	1.05		
	ME	7	12	5.8	9	7	18			9.80	1.05		
	TW	10	14	8.6	13	10	10			10.93	2.18		
	CF	8	9	11	10	12	0			8.40	0.35		
4	IMP	11	14	7	17	10	9			11.33	2.58	14.42	35.69
	CO	12	3	8	12	2.5	11			8.08	0.67		
	SH	14	12	16	4	4	9			9.83	1.08		
	PL	5	2	6	3	4.5	7			4.58	4.17		
	RI	10	3	6	7	7	6			6.50	2.25		
	ME	5	19	6	6	7.8	8			8.63	0.13		
	TW	6	7	9	13	15	9			9.88	1.13		
	CF	7	10	12	8	19	11			11.17	2.42		
5	IMP	14	11	10	18	5	13			11.83	3.08	7.78	50.70
	CO	10	0	7	3	13	13			7.72	1.03		
	SH	3	6	8	7	14	9			7.89	0.86		
	PL	4	14	12	11	12	2			9.17	0.42		
	RI	6	1	7	10	11	9			7.25	1.50		
	ME	10	13	11	10	0.5	5			8.25	0.50		
	TW	13	15	4	7	2	12			8.83	0.08		
	CF	10	10	11	4	12	7			9.06	0.31		
6	IMP	6	17	9.4	7	7				9.28	0.53	8.06	49.81
	CO	12	8	11	8.2	14				10.64	1.89		
	SH	16	5	7	10	6				8.80	0.05		
	PL	2	3	6.8	10	6				5.56	3.19		
	RI	6	8	9.4	13	5				8.20	0.55		
	ME	11	8	11	8.1	7				9.00	0.25		
	TW	10	12	8.1	8.2	12				10.06	1.31		
	CF	7	9	7.4	5.9	13				8.46	0.29		

ISBN:978-84-693-5423-0/DL:T-1414-2010

T	Role	L	M1	M2	M3	M4	M5	M6	M7	Role Mean	Deviation from 8.75	Total SD	TBI1 (%)
7	IMP	8	12	5	10	13	13			10.17	1.42	13.00	38.10
	CO	6	8	2	7	2	1			4.33	4.42		
	SH	7	7	11	8	16	5			9.00	0.25		
	PL	8	6	12	4	5	7			7.00	1.75		
	RI	4	8	9	7	15	8			8.50	0.25		
	ME	5	11	2	11	8	15			8.67	0.08		
	TW	13	9	12	16	2	12			10.67	1.92		
	CF	19	9	17	7	9	9			11.67	2.92		
8	IMP	9	9	15	10	8	7			9.67	0.92	10.67	42.86
	CO	12	11	8	4	8	4			7.83	0.92		
	SH	12	9	8	10	5	2			7.67	1.08		
	PL	12	7	5	18	13	11			11.00	2.25		
	RI	3	8	6	6	8	11			7.00	1.75		
	ME	5	4	8	9	6	11			7.17	1.58		
	TW	12	15	8	8	7	15			10.83	2.08		
	CF	4	7	12	5	15	9			8.67	0.08		
9	IMP	11	8	14	15	11				11.80	3.05	21.20	27.40
	CO	8	5	1	7	10				6.20	2.55		
	SH	12	7	14	11	13				11.40	2.65		
	PL	8	12	1	4	5				6.00	2.75		
	RI	7	8	4	4	7				6.00	2.75		
	ME	10	3	6	7	5				6.20	2.55		
	TW	7	21	8	8	11				11.00	2.25		
	CF	7	6	22	14	8				11.40	2.65		
10	IMP	10	5	4	14	10	17			10.00	1.25	6.83	53.93
	CO	11	16	6	8	6	7			9.00	0.25		
	SH	17	10	5	3	11	10			9.33	0.58		
	PL	9	6	7	3	6	3			5.67	3.08		
	RI	8	15	9	6	6	7			8.50	0.25		
	ME	6	2	6	19	10	10			8.83	0.08		
	TW	3	11	23	2	7	6			8.67	0.08		
	CF	6	5	10	15	14	10			10.00	1.25		
11	IMP	10	8	12	9	9	11			9.83	1.08	9.67	45.28
	CO	12	2	9	5	9	6			7.17	1.58		
	SH	5	1	7	10	19	9			8.50	0.25		
	PL	6	25	4	7	8	7			9.50	0.75		
	RI	10	0	5	10	13	5			7.17	1.58		
	ME	9	19	11	16	4	9			11.33	2.58		
	TW	6	10	12	11	4	12			9.17	0.42		
	CF	12	5	10	2	4	11			7.33	1.42		
12	IMP	11	0	9	12	10	12			9.00	0.25	6.33	55.81
	CO	2	11	10	8	7	9			7.83	0.92		
	SH	13	6	8	11	10	5			8.83	0.08		
	PL	11	23	8	2	4	7			9.17	0.42		
	RI	4	4	7	7	10	6			6.33	2.42		
	ME	6	7	9	12	11	12			9.50	0.75		
	TW	3	14	13	8	12	8			9.67	0.92		
	CF	20	5	6	10	4	11			9.33	0.58		

ISBN:978-84-693-5423-0/DL:T-1414-2010

T	Role	L	M1	M2	M3	M4	M5	M6	M7	Role Mean	Deviation from 8.75	Total SD	TBI1 (%)
13	IMP	6	7	15	12	9				9.80	1.05	12.40	39.22
	CO	17	9	5	8	7				9.20	0.45		
	SH	16	8	8	12	12				11.20	2.45		
	PL	2	10	4	7	6				5.80	2.95		
	RI	1	9	2	12	8				6.40	2.35		
	ME	14	7	11	2	8				8.40	0.35		
	TW	7	12	9	8	5				8.20	0.55		
	CF	7	8	16	9	15				11.00	2.25		
14	IMP	17	6	11	7	9	10			10.00	1.25	8.33	48.98
	CO	19	3	5	11	5	10			8.83	0.08		
	SH	9	7	9	12	5	7			8.17	0.58		
	PL	4	13	8	10	9	7			8.50	0.25		
	RI	4	5	10	4	7	9			6.50	2.25		
	ME	12	6	9	7	6	6			7.67	1.08		
	TW	2	14	12	6	15	13			10.33	1.58		
	CF	3	16	6	13	14	8			10.00	1.25		
15	IMP	16	13	15	11	6	18			13.17	4.42	14.33	35.82
	CO	11	10	7	13	12	4			9.50	0.75		
	SH	12	3	9	13	6	8			8.50	0.25		
	PL	2	9	2	8	11	2			5.67	3.08		
	RI	5	4	6	7	10	5			6.17	2.58		
	ME	6	12	7	12	11	11			9.83	1.08		
	TW	10	14	8	3	8	15			9.67	0.92		
	CF	8	5	16	3	6	7			7.50	1.25		
16	IMP	13	9	14	13	3	12			10.67	1.92	18.17	30.57
	CO	11	7	4	7	7	7			7.17	1.58		
	SH	13	9	6	3	37	5			12.17	3.42		
	PL	3	10	7	8	2	8			6.33	2.42		
	RI	5	9	6	8	4	6			6.33	2.42		
	ME	4	7	6	12	3	11			7.17	1.58		
	TW	9	12	7	7	1	10			7.67	1.08		
	CF	12	7	20	12	13	11			12.50	3.75		
17	IMP	14	17	10	11	13	9			12.33	3.58	16.83	32.21
	CO	8	7	4	0	4	8			5.17	3.58		
	SH	23	9	6	10	8	25			13.50	4.75		
	PL	3	12	5	12	9	6			7.83	0.92		
	RI	4	2	12	4	10	4			6.00	2.75		
	ME	3	7	2	25	10	7			9.00	0.25		
	TW	5	14	13	2	6	9			8.17	0.58		
	CF	10	4	18	6	10	2			8.33	0.42		
18	IMP	2	16	8	6	12	12	16	20	11.50	2.75	13.25	37.65
	CO	6	8	0	7	11	5	6	9	6.50	2.25		
	SH	16	8	5	11	20	2	12	1	9.38	0.63		
	PL	27	1	0	6	3	13	9	11	8.75	0.00		
	RI	8	12	13	9	14	5	4	2	8.38	0.38		
	ME	8	7	13	14	2	9	11	8	9.00	0.25		
	TW	3	15	24	10	7	11	8	16	11.75	3.00		
	CF	0	3	7	7	1	13	4	3	4.75	4.00		

UNIVERSITAT ROVIRA I VIRGILI
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APPENDIX 3.12

SECOND TEAM BALANCE INDEX (TBI2) OF PARTINGTON AND HARRIS

UNIVERSITAT ROVIRA I VIRGILI
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T	Role	L	M1	M2	M3	M4	M5	M6	M7	P.	TBI2
1	IMP	H	L	A	H	H	H	L		1	88.89
	CO	L	H	H	H	A	A	L		1	
	SH	VH	A	H	A	A	H	H		1	
	PL	L	VH	A	H	A	L	A		1	
	RI	L	H	L	L	L	A	A		1	
	ME	A	L	H	A	VH	L	A		1	
	TW	L	A	A	L	L	A	L		2	
	CF	H	L	L	A	A	L	A		1	
2	IMP	VH	L	L	A	H				1	88.89
	CO	VH	L	VH	A	VH				1	
	SH	L	L	A	H	H				1	
	PL	L	L	H	A	A				1	
	RI	L	A	VH	A	A				1	
	ME	A	L	L	L	A				2	
	TW	L	VH	A	L	L				1	
	CF	L	VH	L	A	L				1	
3	IMP	H	L	A	L	A	H			1	100.00
	CO	A	L	H	A	L	L			1	
	SH	VH	L	H	L	A	L			1	
	PL	L	H	L	H	A	VH			1	
	RI	L	A	A	A	VH	H			1	
	ME	L	H	L	A	L	VH			1	
	TW	A	H	A	H	A	A			1	
	CF	A	A	A	A	H	L			1	
4	IMP	A	H	L	VH	A	L			1	88.89
	CO	H	L	A	H	L	H			1	
	SH	VH	H	VH	L	L	H			1	
	PL	L	L	A	L	L	A			2	
	RI	H	L	L	A	A	L			1	
	ME	L	VH	L	L	A	A			1	
	TW	L	L	A	H	VH	A			1	
	CF	L	A	H	A	VH	A			1	
5	IMP	H	A	A	VH	L	H			1	100.00
	CO	H	L	A	L	VH	VH			1	
	SH	L	A	A	A	VH	H			1	
	PL	L	VH	H	H	H	L			1	
	RI	L	L	A	H	H	H			1	
	ME	A	VH	H	A	L	L			1	
	TW	H	VH	L	L	L	A			1	
	CF	A	A	A	L	H	L			1	
6	IMP	L	VH	L	L	L				1	88.89
	CO	H	A	H	A	VH				1	
	SH	VH	L	A	H	A				1	
	PL	L	L	A	H	A				1	
	RI	L	A	H	VH	L				1	
	ME	H	A	H	A	L				1	
	TW	A	A	L	L	A				2	
	CF	L	A	L	L	H				1	

ISBN:978-84-693-5423-0/DL:T-1414-2010

T	Role	L	M1	M2	M3	M4	M5	M6	M7	P.	TBI2
7	IMP	L	A	L	A	H	H			1	88.89
	CO	L	A	L	A	L	L			2	
	SH	A	A	H	A	VH	L			1	
	PL	A	A	H	L	L	A			1	
	RI	L	A	H	A	VH	A			1	
	ME	L	H	L	H	A	VH			1	
	TW	H	A	A	VH	L	A			1	
	CF	VH	A	VH	L	A	A			1	
8	IMP	L	L	H	A	L	L			1	100.00
	CO	H	H	A	L	A	L			1	
	SH	H	H	A	H	L	L			1	
	PL	H	A	L	VH	VH	H			1	
	RI	L	A	L	L	A	VH			1	
	ME	L	L	A	A	L	H			1	
	TW	A	VH	L	L	L	VH			1	
	CF	L	L	H	L	VH	A			1	
9	IMP	A	L	H	H	A				1	80.00
	CO	A	L	L	A	H				1	
	SH	H	A	VH	H	VH				1	
	PL	A	H	L	L	L				1	
	RI	A	A	L	L	A				2	
	ME	A	L	L	L	L				2	
	TW	L	VH	L	L	A				1	
	CF	L	L	VH	H	A				1	
10	IMP	A	L	L	H	A	VH			1	100.00
	CO	H	VH	L	A	L	A			1	
	SH	VH	H	L	L	H	H			1	
	PL	H	A	A	L	A	L			1	
	RI	A	VH	H	L	L	A			1	
	ME	L	L	L	VH	A	A			1	
	TW	L	A	VH	L	L	L			1	
	CF	L	L	A	VH	H	A			1	
11	IMP	A	L	A	L	L	A			2	80.00
	CO	H	L	A	L	A	L			1	
	SH	L	L	A	H	VH	H			1	
	PL	A	VH	L	A	A	A			1	
	RI	H	L	L	H	VH	L			1	
	ME	A	VH	H	VH	L	A			1	
	TW	L	A	A	A	L	A			2	
	CF	H	L	A	L	L	A			1	
12	IMP	A	L	L	A	A	A			2	88.89
	CO	L	H	H	A	A	A			1	
	SH	VH	A	A	H	H	L			1	
	PL	H	VH	A	L	L	A			1	
	RI	L	L	A	A	H	L			1	
	ME	L	L	A	H	H	H			1	
	TW	L	H	H	L	A	L			1	
	CF	VH	L	L	A	L	A			1	

ISBN:978-84-693-5423-0/DL:T-1414-2010

T	Role	L	M1	M2	M3	M4	M5	M6	M7	P	TBI2
13	IMP	L	L	H	A	L				1	88.89
	CO	VH	A	L	A	A				1	
	SH	VH	A	A	H	H				1	
	PL	L	H	L	A	A				1	
	RI	L	H	L	VH	A				1	
	ME	VH	L	H	L	A				1	
	TW	L	A	A	L	L				2	
	CF	L	A	VH	A	VH				1	
14	IMP	VH	L	A	L	L	A			1	100.00
	CO	VH	L	L	H	L	H			1	
	SH	H	A	H	H	L	A			1	
	PL	L	VH	A	H	H	A			1	
	RI	L	L	H	L	A	H			1	
	ME	H	L	A	L	L	L			1	
	TW	L	H	A	L	VH	H			1	
	CF	L	VH	L	H	H	A			1	
15	IMP	VH	H	H	A	L	VH			1	100.00
	CO	H	H	A	VH	H	L			1	
	SH	H	L	H	VH	A	A			1	
	PL	L	H	L	A	H	L			1	
	RI	L	L	L	A	H	L			1	
	ME	L	H	L	H	H	H			1	
	TW	A	H	L	L	L	VH			1	
	CF	A	L	VH	L	L	L			1	
16	IMP	H	L	H	H	L	A			1	88.89
	CO	H	A	L	A	A	A			1	
	SH	VH	H	A	L	VH	L			1	
	PL	L	H	A	A	L	A			1	
	RI	L	H	L	A	L	L			1	
	ME	L	L	L	H	L	H			1	
	TW	A	A	L	L	L	A			2	
	CF	H	L	VH	H	H	A			1	
17	IMP	H	VH	A	A	H	L			1	88.89
	CO	A	A	L	L	L	A			2	
	SH	VH	H	A	H	A	VH			1	
	PL	L	H	L	H	H	A			1	
	RI	L	L	VH	L	H	L			1	
	ME	L	L	L	VH	A	L			1	
	TW	L	H	H	L	L	A			1	
	CF	A	L	VH	L	A	L			1	
18	IMP	L	VH	L	L	A	A	VH	VH	1	88.89
	CO	L	A	L	A	H	L	L	A	2	
	SH	VH	A	L	H	VH	L	H	L	1	
	PL	VH	L	L	A	L	VH	H	H	1	
	RI	A	VH	VH	H	VH	L	L	L	1	
	ME	A	L	VH	VH	L	A	H	A	1	
	TW	L	VH	VH	A	L	A	L	VH	1	
	CF	L	L	L	L	L	H	L	L	1	

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APPENDIX 3.13

THIRD TEAM BALANCE INDEX (TBI3) OF PARTINGTON AND HARRIS

UNIVERSITAT ROVIRA I VIRGILI
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T	Role	L	M1	M2	M3	M4	M5	M6	M7	P.	TBI2
1	IMP	H	L	A	H	H	H	L		4	42.11
	CO	L	H	H	H	A	A	L		3	
	SH	VH	A	H	A	A	H	H		4	
	PL	L	VH	A	H	A	L	A		2	
	RI	L	H	L	L	L	A	A		1	
	ME	A	L	H	A	VH	L	A		2	
	TW	L	A	A	L	L	A	L		2	
	CF	H	L	L	A	A	L	A		1	
2	IMP	VH	L	L	A	H				2	61.54
	CO	VH	L	VH	A	VH				3	
	SH	L	L	A	H	H				2	
	PL	L	L	H	A	A				1	
	RI	L	A	VH	A	A				1	
	ME	A	L	L	L	A				2	
	TW	L	VH	A	L	L				1	
	CF	L	VH	L	A	L				1	
3	IMP	H	L	A	L	A	H			2	53.33
	CO	A	L	H	A	L	L			1	
	SH	VH	L	H	L	A	L			2	
	PL	L	H	L	H	A	VH			3	
	RI	L	A	A	A	VH	H			2	
	ME	L	H	L	A	L	VH			2	
	TW	A	H	A	H	A	A			2	
	CF	A	A	A	A	H	L			1	
4	IMP	A	H	L	VH	A	L			2	47.06
	CO	H	L	A	H	L	H			3	
	SH	VH	H	VH	L	L	H			4	
	PL	L	L	A	L	L	A			2	
	RI	H	L	L	A	A	L			1	
	ME	L	VH	L	L	A	A			1	
	TW	L	L	A	H	VH	A			2	
	CF	L	A	H	A	VH	A			2	
5	IMP	H	A	A	VH	L	H			3	40.00
	CO	H	L	A	L	VH	VH			3	
	SH	L	A	A	A	VH	H			2	
	PL	L	VH	H	H	H	L			4	
	RI	L	L	A	H	H	H			3	
	ME	A	VH	H	A	L	L			2	
	TW	H	VH	L	L	L	A			2	
	CF	A	A	A	L	H	L			1	
6	IMP	L	VH	L	L	L				1	57.14
	CO	H	A	H	A	VH				3	
	SH	VH	L	A	H	A				2	
	PL	L	L	A	H	A				1	
	RI	L	A	H	VH	L				2	
	ME	H	A	H	A	L				2	
	TW	A	A	L	L	A				2	
	CF	L	A	L	L	H				1	

T	Role	L	M1	M2	M3	M4	M5	M6	M7	P.	TBI2
7	IMP	L	A	L	A	H	H			2	50.00
	CO	L	A	L	A	L	L			2	
	SH	A	A	H	A	VH	L			2	
	PL	A	A	H	L	L	A			1	
	RI	L	A	H	A	VH	A			2	
	ME	L	H	L	H	A	VH			3	
	TW	H	A	A	VH	L	A			2	
	CF	VH	A	VH	L	A	A			2	
8	IMP	L	L	H	A	L	L			1	50.00
	CO	H	H	A	L	A	L			2	
	SH	H	H	A	H	L	L			3	
	PL	H	A	L	VH	VH	H			4	
	RI	L	A	L	L	A	VH			1	
	ME	L	L	A	A	L	H			1	
	TW	A	VH	L	L	L	VH			2	
	CF	L	L	H	L	VH	A			2	
9	IMP	A	L	H	H	A				2	53.33
	CO	A	L	L	A	H				1	
	SH	H	A	VH	H	VH				4	
	PL	A	H	L	L	L				1	
	RI	A	A	L	L	A				2	
	ME	A	L	L	L	L				2	
	TW	L	VH	L	L	A				1	
	CF	L	L	VH	H	A				2	
10	IMP	A	L	L	H	A	VH			2	53.33
	CO	H	VH	L	A	L	A			2	
	SH	VH	H	L	L	H	H			4	
	PL	H	A	A	L	A	L			1	
	RI	A	VH	H	L	L	A			2	
	ME	L	L	L	VH	A	A			1	
	TW	L	A	VH	L	L	L			1	
	CF	L	L	A	VH	H	A			2	
11	IMP	A	L	A	L	L	A			2	50.00
	CO	H	L	A	L	A	L			1	
	SH	L	L	A	H	VH	H			3	
	PL	A	VH	L	A	A	A			1	
	RI	H	L	L	H	VH	L			2	
	ME	A	VH	H	VH	L	A			3	
	TW	L	A	A	A	L	A			2	
	CF	H	L	A	L	L	A			1	
12	IMP	A	L	L	A	A	A			2	53.33
	CO	L	H	H	A	A	A			2	
	SH	VH	A	A	H	H	L			3	
	PL	H	VH	A	L	L	A			2	
	RI	L	L	A	A	H	L			1	
	ME	L	L	A	H	H	H			3	
	TW	L	H	H	L	A	L			2	
	CF	VH	L	L	A	L	A			1	

ISBN:978-84-693-5423-0/DL:T-1414-2010

T	Role	L	M1	M2	M3	M4	M5	M6	M7	P	TBI2
13	IMP	L	L	H	A	L				1	50.00
	CO	VH	A	L	A	A				1	
	SH	VH	A	A	H	H				3	
	PL	L	H	L	A	A				1	
	RI	L	H	L	VH	A				2	
	ME	VH	L	H	L	A				2	
	TW	L	A	A	L	L				2	
	CF	L	A	VH	A	VH				2	
14	IMP	VH	L	A	L	L	A			1	57.14
	CO	VH	L	L	H	L	H			3	
	SH	H	A	H	H	L	A			3	
	PL	L	VH	A	H	H	A			3	
	RI	L	L	H	L	A	H			2	
	ME	H	L	A	L	L	L			1	
	TW	L	H	A	L	VH	H			3	
	CF	L	VH	L	H	H	A			3	
15	IMP	VH	H	H	A	L	VH			4	42.11
	CO	H	H	A	VH	H	L			4	
	SH	H	L	H	VH	A	A			3	
	PL	L	H	L	A	H	L			2	
	RI	L	L	L	A	H	L			1	
	ME	L	H	L	H	H	H			3	
	TW	A	H	L	L	L	VH			2	
	CF	A	L	VH	L	L	L			1	
16	IMP	H	L	H	H	L	A			3	40.00
	CO	H	A	L	A	A	A			1	
	SH	VH	H	A	L	VH	L			3	
	PL	L	H	A	A	L	A			1	
	RI	L	H	L	A	L	L			1	
	ME	L	L	L	H	L	H			2	
	TW	A	A	L	L	L	A			2	
	CF	H	L	VH	H	H	A			4	
17	IMP	H	VH	A	A	H	L			3	47.06
	CO	A	A	L	L	L	A			2	
	SH	VH	H	A	H	A	VH			4	
	PL	L	H	L	H	H	A			3	
	RI	L	L	VH	L	H	L			2	
	ME	L	L	L	VH	A	L			1	
	TW	L	H	H	L	L	A			2	
	CF	A	L	VH	L	A	L			1	
18	IMP	L	VH	L	L	A	A	VH	VH	3	44.44
	CO	L	A	L	A	H	L	L	A	2	
	SH	VH	A	L	H	VH	L	H	L	4	
	PL	VH	L	L	A	L	VH	H	H	4	
	RI	A	VH	VH	H	VH	L	L	L	4	
	ME	A	L	VH	VH	L	A	H	A	3	
	TW	L	VH	VH	A	L	A	L	VH	3	
	CF	L	L	L	L	L	H	L	L	1	

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APPENDIX 3.14

FISHER'S TASK-RELATIONSHIP CONSTRUCT

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Team	Participant	Primary Role	Secondary Role	Codes (Fisher)
2	L	IMP	CO	2
	M1	CF	TW	3
	M2	RI	CO	2
	M3	IMP	SH	3
	M4	IMP	CO	2
3	L	SH	IMP	3
	M1	TW	ME	3
	M2	IMP	CF	3
	M3	TW	PL	3
	M4	RI	CF	3
	M5	ME	PL	1
4	L	SH	CO	3
	M1	ME	IMP	3
	M2	SH	CF	1
	M3	IMP	TW	2
	M4	CF	TW	3
	M5	IMP	CF	3
5	L	IMP	TW	2
	M1	TW	PL	3
	M2	PL	ME/CF	1
	M3	IMP	PL	3
	M4	SH	CO	3
	M5	IMP	CO	2
6	L	SH	CO	3
	M1	IMP	TW	2
	M2	CO	ME	3
	M3	RI	PL/SH	3
	M4	CO	CF	3
10	L	SH	CO	3
	M1	CO	RI	2
	M2	TW	CF	3
	M3	ME	CF	1
	M4	CF	SH	1
	M5	IMP	SH/ME/CF	3
12	L	CF	SH	1
	M1	PL	TW	3
	M2	TW	CO	2
	M3	IMP	ME	3
	M4	TW	ME	3
	M5	IMP	ME	3
14	L	CO	IMP	2
	M1	CF	TW	3
	M2	TW	IMP	2
	M3	CF	SH	1
	M4	CF	TW	3
	M5	TW	CO/IMP	2

ISBN:978-84-693-5423-0/DL:T-1414-2010

Team	Participant	Primary Role	Secondary Role	Codes (Fisher)
15	L	IMP	SH	3
	M1	TW	IMP	2
	M2	CF	IMP	3
	M3	CO	SH	3
	M4	CO	PL/ME	3
	M5	IMP	TW	2
16	L	IMP	SH	3
	M1	TW	PL	3
	M2	CF	IMP	3
	M3	IMP	ME/CF	3
	M4	SH	CF	1
	M5	IMP	ME/CF	3

"1" = Interact neither harmoniously nor productively

"2" = Interact harmoniously but not productively

"3 = Interact both harmoniously and productively

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

APPENDIX 4

for the Results Chapter

UNIVERSITAT ROVIRA I VIRGILI
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Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

APPENDIX 4A

THE ANALYSES OF THE SAMPLE CHARACTERISTICS

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
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UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4A-1: The means and the standard deviations for the Belbin's eight team roles by various study samples

Team Role	Source	Mean	SD
Shaper	**Present Study**	11.2	5.0
	Yearn *et al.* 2003	9.4	3.9
	Dulewicz, 1995	4.7	1.9
	Fisher *et al.* 2000	4.2	1.9
	Fisher *et al.* 2002	5.6	1.7
Implementer	**Present Study**	10.4	3.6
	Yearn *et al.* 2003	11.4	4.6
	Dulewicz, 1995	5.5	1.9
	Fisher *et al.* 1998	5.9	2.1
	Fisher *et al.* 2002	6.0	1.9
Completer finisher	**Present Study**	10.0	4.7
	Yearn *et al.* 2003	8.2	4.5
	Dulewicz, 1995	4.9	2.5
	Fisher *et al.* 1998	4.0	2.2
	Fisher *et al.* 2002	5.2	2.0
Teamworker	**Present Study**	8.7	5.0
	Yearn *et al.* 2003	6.9	3.7
	Dulewicz, 1995	6.2	2.1
	Fisher *et al.* 1998	6.6	2.1
	Fisher *et al.* 2002	5.9	1.9
Coordinator	**Present Study**	8.6	4.1
	Yearn *et al.* 2003	8.2	4.2
	Dulewicz, 1995	6.3	1.6
	Fisher *et al.* 1998	7.2	1.7
	Fisher *et al.* 2002	6.0	2.0
Monitor evaluator	**Present Study**	8.2	4.3
	Yearn *et al.* 2003	7.4	4.3
	Dulewicz, 1995	4.6	2.0
	Fisher *et al.* 1998	3.8	1.6
	Fisher *et al.* 2002	4.8	2.1
Resource investigator	**Present Study**	6.4	3.2
	Yearn *et al.* 2003	7.2	3.9
	Dulewicz, 1995	6.8	2.1
	Fisher *et al.* 1998	8.0	2.0
	Fisher *et al.* 2002	4.93	2.0
Plant	**Present Study**	6.3	4.6
	Yearn *et al.* 2003	4.6	4.0
	Dulewicz, 1995	5.4	2.0
	Fisher *et al.* 1998	4.9	1.9
	Fisher *et al.* 2002	6.1	2.0

Note: N for the present study = 63; N for Yearn *et al.* (2003) = 43; N for Dulewicz (1995) =100; N for Fisher *et al.* (2000) manager sample = 1796; N for Fisher *et al.* (2002) non-manager sample = 160

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4A-2: The means and the standard deviations for the six managerial styles by various study samples

Team Role	Source	Mean	SD
Authoritative	**Present Study**	7.5	1.5
	HayGroup Sample	4.8	0.5
	American Sample	14.5	5.0
	Middle Eastern Sample	13.0	6.2
Democratic	**Present Study**	7.1	1.6
	HayGroup Sample	4.2	0.6
	American Sample	12.8	6.2
	Middle Eastern Sample	12.0	7.8
Coaching	**Present Study**	6.5	1.6
	HayGroup Sample	4.1	0.7
	American Sample	8.5	6.3
	Middle Eastern Sample	9.6	8.2
Affiliative	**Present Study**	5.4	1.5
	HayGroup Sample	4.4	0.6
	American Sample	11.8	5.1
	Middle Eastern Sample	13.9	9.0
Pacesetting	**Present Study**	5.3	1.4
	HayGroup Sample	3.2	0.61
	American Sample	16.0	5.4
	Middle Eastern Sample	12.7	7.1
Coercive	**Present Study**	4.2	1.8
	HayGroup Sample	2.8	0.7
	American Sample	5.4	5.0
	Middle Eastern Sample	7.7	7.6

Note: N for the present study = 63; N for HayGroup sample = 25531; N for American sample = 91, N for Middle Eastern sample = 63

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Appendix 4A-3: Means and standard deviations for each value type for study populations. ("-1" = opposed to my values, "7" = of supreme importance)

Value Type	Students					Leaders & Executives & Managers						
						Countries					Organization	
	PMP	54 Nations	Spain [a]	Japan [a]	America [a]	Australia	Japan	China	Russia	Canada	For-profit	Non-profit
Benevolence	4.84	4.59	0.45	0.20	0.46	5.26	4.15	4.62	4.03	4.65	4.75	5.14
	(0.77)	(0.25)	(0.30)	(0.47)	(0.34)	(na)	(na)	(na)	(na)	(0.82)	(0.92)	(0.77)
Self-direction	4.64	4.58	0.75	0.40	0.16	5.06	4.22	3.81	4.34	5.05	5.03	5.48
	(0.73)	(0.31)	(0.47)	(0.37)	(0.37)	(na)	(na)	(na)	(na)	(0.79)	(0.79)	(0.63)
Conformity	4.60	3.98	-0.32	0.21	0.13	4.85	3.73	4.21	3.55	4.17	4.29	4.02
	(0.99)	(0.48)	(0.43)	(0.41)	(0.44)	(na)	(na)	(na)	(na)	(1.09)	(1.13)	(1.17)
Hedonism	4.43	3.82	0.17	-0.18	0.00	4.32	3.33	2.90	3.06	4.21	3.98	4.31
	(1.22)	(0.65)	(0.66)	(0.69)	(0.74)	(na)	(na)	(na)	(na)	(1.21)	(1.53)	(1.35)
Achievement	4.30	4.02	-0.09	0.22	0.30	5.45	4.22	4.36	3.97	4.94	4.82	4.79
	(0.94)	(0.30)	(0.45)	(0.48)	(0.37)	(na)	(na)	(na)	(na)	(0.77)	(0.82)	(0.86)
Stimulation	4.24	3.43	-0.38	-0.01	-0.21	4.72	2.77	3.35	2.65	3.77	3.83	4.28
	(1.13)	(0.34)	(0.70)	(0.75)	(0.61)	(na)	(na)	(na)	(na)	(1.13)	(1.36)	(1.37)
Security	4.04	3.99	-0.35	0.13	0.21	5.02	4.10	4.50	4.65	4.44	4.21	4.33
	(1.02)	(0.36)	(0.46)	(0.41)	(0.40)	(na)	(na)	(na)	(na)	(0.88)	(1.09)	(0.86)
Universalism	4.02	4.25	0.52	-0.05	-0.53	4.77	4.18	4.03	3.53	4.28	4.59	5.26
	(0.90)	(0.29)	(0.35)	(0.36)	(0.49)	(na)	(na)	(na)	(na)	(1.40)	(0.90)	(1.11)
Tradition	2.96	2.73	-0.56	-0.76	-0.31	3.65	2.61	2.90	1.93	2.56	2.37	2.49
	(1.08)	(0.48)	(0.54)	(0.54)	(0.44)	(na)	(na)	(na)	(na)	(1.21)	(1.01)	(1.07)
Power	2.67	2.39	-0.92	-0.73	-0.71	3.84	2.14	2.73	2.75	3.01	2.48	2.08
	(1.01)	(0.43)	(0.41)	(0.58)	(0.69)	(na)	(na)	(na)	(na)	(1.13)	(1.39)	(1.15)

"a" In these studies mean ratings were normalized around individual students' mean scores and standard deviations. For our sample the mean scores for value types using this method is presented in **Appendix 4A-4**, "na" = not available

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4A-4: The mean scores for the ten value types for the PMP students calculated after scale use correction

	Mean	SD
Benevolence	0.68	0.63
Self-direction	0.48	0.66
Conformity	0.44	0.77
Hedonism	0.27	1.10
Achievement	0.14	0.77
Stimulation	0.08	1.04
Security	-0.12	0.85
Universalism	-0.14	0.64
Tradition	-1.20	0.94
Power	-1.49	0.99

Appendix 4A-5: The means and the standard deviations for the Belbin's eight team roles for the leader students

	Mean	SD
Shaper	12.98	5.10
Implementer	10.79	4.29
Coordinator	10.04	4.06
Completer finisher	9.08	4.41
Monitor evaluator	7.65	3.47
Teamworker	7.06	3.55
Plant	6.60	5.53
Resource Investigator	5.79	2.73

Appendix 4A-6: The means and the standard deviations for six managerial styles for the leader students

	Mean	SD
Authoritative	7.67	1.55
Democratic	7.00	1.53
Coaching	6.79	1.62
Affiliative	5.25	1.6
Pacesetting	4.88	1.36
Coercive	4.38	1.86

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4A-7: The means and the standard deviations for the four MBTI scales for the leader students

	Mean	SD
Extraversion-Introversion	94.92	22.55
Sensing-Intuition	84.58	21.13
Thinking-Feeling	83.50	24.29
Judging-Perceiving	74.50	15.41

Appendix 4A-8: The mean scores for the ten value types for the leader students

	Raw scores		Corrected for scale use	
	Mean	SD	Mean	SD
Benevolence	4.58	0.72	0.53	0.57
Self-direction	4.58	0.55	0.52	0.62
Achievement	4.45	0.79	0.39	0.62
Hedonism	4.38	1.40	0.32	0.77
Conformity	4.38	0.10	0.32	1.41
Stimulation	4.25	1.27	0.19	1.21
Universalism	3.93	0.73	-0.13	0.54
Security	3.9	0.92	-0.15	0.69
Tradition	2.98	1.19	-1.07	1.00
Power	2.90	0.82	-1.15	0.82

UNIVERSITAT ROVIRA I VIRGILI
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UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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APPENDIX 4B

THE LEADERSHIP BEHAVIORS CODED IN THE LEARNING JOURNALS OF THE ELEVEN LEADER STUDENTS

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-1: The frequency distribution of the coded 354 behaviors in the learning journal of L1 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Strives to be competent	9
			2	Learns from own and others' mistakes and experiences	3
			3	Puts into practice that everything learns	3
			4	Seeks feedback to improve performance	2
			5	Sees setbacks and errors as a chance to improve	2
			6	Shares the knowledge and experience with others	1
		Total			**20**
	Teamwork		7	Demonstrates confidence and respect for others	10
			8	Is ready to make personal sacrifices	3
		Total			**13**
	Results Orientation		9	Knows when she has a problem and acts immediately	3
			10	Identifies what needs to be done and acts without waiting	2
		Total			**5**
	Interpersonal Communication		11	Knows to listen actively being primarily preoccupied for understanding	2
			12	Ensures that the others understand the importance of what she is conveying	2
		Total			**4**
	Responsiveness to Change		13	Adapts self rapidly to new situations	3
		Total			**3**
	Client Orientation		14	Follows up the clients' degree of satisfaction	1
		Total			**1**
	Total in Level 1				**46**
Level 2	Teamwork		1	Demonstrates caring leadership	39
			2	Assesses and selects appropriate approach to lead	14
			3	Creates an atmosphere mutual trust, confidence, and respect	12
			4	Positions self as the leader	9
			5	Confronts conflicts in the team in a timely and constructive manner	8
			6	Gives recognition to the contribution of others	7
			7	Facilitates the meetings	7
			8	Promotes communication in the team	5
			9	Ensures that the others have clear objectives	1
		Total			**102**
	Commitment to Learning		10	Provides a balanced view of the strengths and weaknesses of others	27
			11	Is committed to enlisting support for members	16
			12	Asks insightful questions that facilitate learning and understanding	8
			13	Calms others in new learning situations	7
			14	Provides timely and constructive feedback for development	3
			15	Facilitates that the others learn to solve the problems on their own	1
		Total			**62**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-1 continued

Level	Competency		Behavior		Frequency
Level 2	Interpersonal Communication		16	Understands others' underlying needs, interests, problems and motivations	32
			17	Convince others appealing to their interests	5
			18	Presents logical and convincing arguments	4
			19	Demonstrates tact and diplomacy	1
		Total			**42**
	Results Orientation		20	Confronts people with performance problems	15
			21	Manages performance	11
			22	Provides timely constructive feedback	5
			23	Conveys a sense of urge to finish the work or solve the problem	4
			24	Holds people accountable for their performance	3
			25	Readily adjusts the plans to achieve objectives	2
			26	Does not shy away to evaluate the work of others	1
		Total			**41**
	Integrity		27	Confronts immediately inappropriate behavior	5
			28	Treats others justly	4
		Total			**9**
	Drive for Excellence		29	Facilitates that the others can generate ideas to make things better	4
			30	Demonstrates a positive attitude to be able to do the things	3
		Total			**7**
	Total in Level 2				**263**
Level 3	Results Orientation		1	Gives others liberty to decide how to do their work	6
			2	Demands high performance (being an example)	5
		Total			**11**
	Commitment to Learning		3	Encourages others to learn continuously from their activities as well as from others	6
			4	Helps others to discover their capacities and potentials	3
			5	Looks for and proposes adequate challenges for personal development	1
		Total			**10**
	Drive for Excellence		6	Provokes in others the desire to make things every time better	7
			7	Recognizes others' creativity and innovation	2
		Total			**9**
	Integrity		8	Is a role model for the demonstration of organizational values	4
			9	Defends what she believes to be true and necessary even it might not be popular	2
			10	Can be trusted with confidential information	1
		Total			**7**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-1 continued

Level	Competency		Behavior		Frequency
Level 3	Interpersonal Communication		11	Is easily accessible to others	3
			12	Describes a vision for the future that inspires others to work for it	2
			13	Role models	1
			14	Speaks with conviction and an inspirational manner about the objective and importance of daily work	1
			15	Interacts with others in a manner that increases their motivation	**1**
		Total			**8**
	Total in Level 3				**45**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-2: The frequency distribution of the coded 104 behaviors in the learning journal of L2 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Strives to be competent	4
			2	Seeks feedback to improve performance	2
			3	Puts into practice that everything learns	1
			4	Sees setbacks and errors as a chance to improve	1
		Total			**8**
	Teamwork		5	Shares all the relevant information with others	3
			6	Demonstrates confidence and respect for others	1
		Total			**4**
	Results Orientation		7	Identifies what needs to be done and acts without waiting	2
			8	Acts to avoid an imminent problem or to benefit from an immediate opportunity	1
		Total			**3**
	Integrity		9	Assumes the responsibility of her actions does not blame others	2
		Total			**2**
	Drive for Excellence		10	Generates new ideas that adds value	1
		Total			**1**
	Total in Level 1				**18**
Level 2	Teamwork		1	Demonstrates caring leadership	8
			2	Assesses and selects appropriate approach to lead	5
			3	Positions self as the leader	3
			4	Confronts conflicts in the team in a timely and constructive manner	2
			5	Gives recognition to the contribution of others	2
			6	Involves others in the elaboration of plan of acts	2
			7	Ensures that the others have clear objectives	1
			8	Creates an atmosphere mutual trust, confidence, and respect	1
			9	Promotes communication in the team	1
		Total			**25**
	Commitment to Learning		10	Provides a balanced view of the strengths and weaknesses of others	17
			11	Provides timely and constructive feedback for development	4
			12	Calms others in new learning situations	1
		Total			**22**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-2 continued

Level	Competency			Behavior	Frequency
Level 2	Results Orientation		13	Holds people accountable for their performance	8
			14	Manages performance	7
			15	Readily adjusts the plans to achieve objectives	2
			16	Confronts people with performance problems	1
			17	Does not shy away to evaluate the work of others	1
			18	Provides timely constructive feedback	1
			19	Conveys a sense of urge to finish the work or solve the problem	1
		Total			**21**
	Interpersonal Communication		20	Understands others' underlying needs, interests, problems and motivations	8
			21	Convince others appealing to their interests	3
		Total			**11**
	Drive for Excellence		22	Facilitates that the others can generate ideas to make things better	2
			23	Demonstrates a positive attitude to be able to do the things	2
		Total			**4**
	Total in Level 2				83
Level 3	Results Orientation		1	Gives others liberty to decide how to do their work	1
			2	Creates conditions that the other can work autonomously	1
		Total			**2**
	Drive for Excellence		3	Promotes an environment of experimentation where people are not afraid to fail or take risks	1
		Total			**1**
	Total in Level 3				3

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-3: The frequency distribution of the coded 156 behaviors in the learning journal of L3 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Teamwork		1	Demonstrates confidence and respect for others	9
			2	Is ready to make personal sacrifices to reach the team objectives	2
			3	Shares all the relevant information	1
		Total			**12**
	Commitment to Learning		5	Strives to be competent	4
			6	Puts into practice that everything learns	2
				Learns from own and others' mistakes and errors	1
		Total			**7**
	Results Orientation		7	Persists to achieve objectives	2
			8	Acts to avoid an imminent problem or to benefit from an immediate opportunity	1
			9	Identifies what needs to be done and acts without waiting	1
		Total			**4**
	Interpersonal Communication		10	Knows to listen actively being primarily preoccupied for understanding	1
			11	Ensures that the others understand the importance of what she is saying	1
		Total			**2**
	Responsiveness to Change		12	Adapts self rapidly to new situations	1
		Total			**1**
	Total in Level 1				27
Level 2	Teamwork		1	Understands others' underlying needs, interests, problems and motivations	26
			2	Systematically builds consensus	5
			3	Presents logical and convincing arguments	4
			4	Convince others appealing to their interests	3
			5	Demonstrates tact and diplomacy	2
		Total			**40**
	Commitment to Learning		6	Provides a balanced view of the strengths and weaknesses of others	10
			7	Is committed to enlisting support for others	9
			8	Calms others in new learning situations	5
			9	Asks insightful questions that facilitate learning and understanding	4
			10	Facilitates that the others learn to solve their problems by themselves	1
		Total			**29**

ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-3 continued

Level	Competency		Behavior		Frequency
Level 2	Teamwork		11	Demonstrates caring leadership	13
			12	Creates an atmosphere of mutual trust and confidence	3
			13	Confronts conflicts in a timely manner	2
			14	Assesses and selects appropriate approach to lead	1
			15	Promotes communication in the team	1
			16	Facilitates the meeting	1
			17	Ensures that the others have clear objectives	1
		Total			**22**
	Results Orientation		18	Manages performance	8
			19	Confronts people with performance problems	4
			20	Provides timely constructive feedback	2
			21	Conveys a sense of urge to finish the job	2
			22	Readily adjusts plans to achieve objectives	2
			23	Does not shy away to evaluate the work of others	1
			24	Holds people accountable for their performance	1
		Total			**20**
	Drive for Excellence		25	Demonstrates a positive attitude to be able to do the things	4
			26	Motivates others to participate in improvement activities	3
			27	Facilitates that the others can generate ideas to make things better	2
		Total			**9**
	Responsiveness to Change		28	Helps others to resolve their resistance to change	**1**
	Total in Level 2				**121**
Level 3	Results Orientation		1	Gives others liberty to decide how to do their work	3
	Commitment to Learning		2	Helps others to discover their potentials and capacities	2
	Interpersonal Communication		3	Speaks with conviction and with an inspirational manner about the objective and the importance of the daily work	1
	Drive for Excellence		4	Provokes in others the desire to make things every time better	1
	Integrity		5	Answers the questions with good intentions	1
	Total in Level 3				**8**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-4: The frequency distribution of the coded 194 behaviors in the learning journal of L4 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Strives to be competent	22
			2	Seeks feedback to improve performance	8
			3	Puts into practice that everything learns	5
			4	Sees setbacks and errors as a chance to improve	4
		Total			**39**
	Results Orientation		5	Acts to avoid an imminent problem or to benefit from an immediate opportunity	4
			6	Persists to achieve objectives	1
		Total			**5**
	Teamwork		7	Demonstrates confidence and respect for others	2
			8	Shares all the relevant information with others	1
		Total			**3**
	Integrity		9	Assumes the responsibility of her actions does not blame others	3
		Total			**3**
	Interpersonal Communication		10	Knows to listen actively by being primarily preoccupied for understanding	1
			11	Makes others feel valued when interacting with others	1
		Total			**2**
	Client Orientation		12	Before acting, look to understand the needs and expectations of clients	**1**
	Responsiveness to Change		13	Maintains calm and confident during period of change	**1**
	Total in Level 1				**54**
Level 2	Teamwork		1	Demonstrates caring leadership	18
			2	Facilitates the meeting	8
			3	Confronts conflicts in the team in a timely and constructive manner	6
			4	Gives recognition to the contribution of others	3
			5	Promotes communication in the team	2
			6	Positions self as the leader	2
			7	Assesses and selects appropriate approach to lead	1
			8	Creates an atmosphere mutual trust, confidence, and respect	1
		Total			**41**
	Commitment to Learning		9	Provides a balanced view of the strengths and weaknesses of others	8
			10	Provides timely and constructive feedback for development	6
			11	Asks insightful questions that facilitate learning and understanding	5
			12	Is committed enlisting support for members	5
			13	Calms others in new learning situations	2
		Total			**26**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-4 continued

Level	Competency		Behavior		Frequency
Level 2	Interpersonal Communication		14	Understands others' underlying needs, interests	11
			15	Systematically builds consensus	2
			16	Presents logical and convincing arguments	2
			17	Demonstrates tact and diplomacy	2
			18	Convince others appealing to their interests	1
		Total			**18**
	Results Orientation		19	Confronts people with performance problems	7
			20	Manages performance	5
			21	Conveys a sense of urge to finish the job	1
			22	Provides timely constructive feedback	1
			23	Readily adjusts plans to achieve objectives	1
		Total			**15**
	Drive for Excellence		24	Demonstrates a positive attitude to be able to do the things	3
			25	Facilitates that the others can generate ideas to make things better	2
			26	Motivates others to participate in improvement activities	1
		Total			**5**
	Integrity		27	Confronts immediately inappropriate behavior	**5**
	Client Orientation		28	Corrects rapidly the problems in client service without becoming defensive	2
			29	Actively seeks to make things better for clients	1
			30	Communicates with clients in a proactive manner	1
		Total			**4**
	Responsiveness to Change		31	Involves others in the planification of change implementation	**1**
	Total in Level 2				**116**
Level 3	Results Orientation		1	Gives others liberty to decide how to do their work	5
			2	Gradually increases the responsibilities of others	2
			3	Creates conditions that the other can work autonomously	1
		Total			**8**
	Drive for Excellence		4	Provokes in others the desire to make things every time better	3
			5	Promotes an environment of experimentation where people are not afraid to fail or take risks	1
		Total			**4**
	Interpersonal Communication		6	Speaks with conviction and with an inspirational manner about the objective and importance of daily work	2
			7	Describes a vision for future that inspires others to work for it	1
		Total			**3**
	Client Orientation		8	Promotes a climate oriented to the clients	**3**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix ·4B-4 continued

Level	Competency		Behavior		Frequency
Level3	Responsiveness to Change		9	Transmits optimism about the positive outcomes of change	2
			10	Fosters frank conversation about the reasons of change	1
		Total			**3**
	Total in Level 2				**24**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-5: The frequency distribution of the coded 79 behaviors in the learning journal of L5 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Strives to be competent	6
			2	Seeks feedback to improve performance	6
			3	Learns from own and others' experiences	1
		Total			**13**
	Teamwork		4	Demonstrates confidence and respect for others	**3**
	Results Orientation		5	Acts to avoid an imminent problem or to benefit from an immediate opportunity	**1**
	Responsiveness to Change		6	Adapts self rapidly to new situations	**1**
	Total in Level 1				**18**
Level 2	Teamwork		1	Demonstrates caring leadership	7
			2	Assesses and selects appropriate approach to lead	4
			3	Ensures that the others have clear objectives	4
			4	Positions self as the leader	3
			5	Confronts conflicts in the team in a timely and constructive manner	2
			6	Gives recognition to the contribution of others	1
			7	Facilitates the meeting	1
		Total			**22**
	Results Orientation		8	Manages performance	8
			9	Conveys a sense of urge to finish the job	3
			10	Confronts people with performance problems	1
			11	Readily adjusts plans to achieve objectives	1
		Total			**13**
	Interpersonal Communication		12	Demonstrates tact an d diplomacy	3
			13	Understands others underlying needs, interests problems	1
			14	Systematically builds consensus	1
			15	Ensures that the others have clear objectives	1
			16	Convince others appealing to their interests	1
		Total			**7**
	Commitment to Learning		17	Provides a balanced view of members	5
			18	Calms others in new learning situations	1
		Total			**6**
	Drive for Excellence		19	Demonstrates a positive attitude to be able to do the things	4
			20	Runs calculated risks when implementing new ideas	1
		Total			**5**
	Total in Level 2				**53**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-5 continued

Level	Competency		Behavior		Frequency
Level 3	Drive for Excellence		1	Provokes in others the desire to make things better every time	**5**
	Results Orientation		2	Gives others the liberty to decide how to do their work	1
			3	Gradually increases the responsibilities of others	1
		Total			**2**
	Interpersonal Communication		4	Describes a vision for the future	**1**
	Total in Level 3				8

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-6: The frequency distribution of the coded 97 behaviors in the learning journal of L6 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Is willing and open to receive feedback	6
			2	Puts into practice everything that learns	2
			3	Wants to do the things well	1
			4	Sees set-backs and errors as a chance to improve	1
		Total			**10**
	Teamwork		5	Has confidence in team members	5
		Total			**5**
	Integrity		6	Expresses openly what he thinks	1
			7	Assumes the responsibility of his/her actions, does not blame others	1
		Total			**2**
	Total in level 1				**17**
Level 2	Commitment to Learning		1	Provides a balanced view of members' strengths and weaknesses	17
			2	Is committed to enlisting support for members	3
			3	Calms others in new learning situations	1
		Total			**21**
	Teamwork		4	Demonstrates caring leadership	15
			5	Ensures that the others have clear objectives, expectations and responsibilities	3
			6	Assesses and selects appropriate approach to lead	1
			7	Gives recognition to the contribution of others	1
		Total			**20**
	Results Orientation		8	Manages performance	9
			9	Confronts people with performance problems	3
			10	Readily adjusts plans to achieve objectives	1
			11	Provides constructive timely feedback	1
		Total			**14**
	Interpersonal Communication		12	Understands' others underlying problems, motivations and needs	8
			13	Demonstrates tact and diplomacy	2
		Total			**10**
	Drive for Excellence		14	Demonstrates a positive attitude to be able to do the things	8
		Total			**8**
	Integrity		15	Confronts immediately inappropriate behaviour	2
			16	Admits openly mistakes and errors	1
		Total			**3**
	Total in Level 2				**76**
Level 3	Interpersonal Communication		1	Is accessible to the others	2
			2	Speaks with conviction and with an inspirational manner about the objective and importance of daily work	1
		Total			**3**
	Commitment to Learning		3	Look and proposes adequate challenges for personal development	1
		Total			**1**
	Total in Level 3				**4**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-7: The frequency distribution of the coded 79 behaviors in the learning journal of L7 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Strives to be competent	4
			2	Seeks feedback to improve performance	2
		Total			**6**
	Integrity		3	Assumes the responsibility of his/her actions, does not blame others	3
			4	Expresses what s/he thinks even knowing that the message will not well received by other	1
		Total			**4**
	Client Orientation		5	Before acting, look to understand the needs and expectation of clients	1
			6	Establishes and maintains effective communication channel with clients	1
		Total			**2**
	Results Orientation		7	Acts to avoid an imminent problem or to benefit from an immediate opportunity	**1**
	Responsiveness to Change		8	Adapts self rapidly to new situations	**1**
	Teamwork		9	Demonstrates confidence and respect for others	**1**
	Total in level 1				**15**
Level 2	Teamwork		1	Demonstrates caring leadership	9
			2	Positions self as the leader	4
			3	Assesses and selects appropriate approach to lead	3
			4	Facilitates the meeting	2
			5	Gives recognition to the contribution of others	2
			6	Confronts the conflicts in the team in a timely and constructive manner	1
			7	Promotes communication in the team	1
		Total			**22**
	Interpersonal Communication		8	Understands others' underlying needs, interests and problems	7
			9	Demonstrates tact and diplomacy	4
			10	Presents logical and convincing arguments	3
			11	Convince others appealing to their interests	1
		Total			**15**
	Commitment to Learning		12	Provides a balanced view of members' strengths and weaknesses	4
			13	Asks insightful questions that facilitate the learning and understanding	4
			14	Is committed to enlisting support for others	2
			15	Calms others in new learning situations	1
		Total			**11**
	Results Orientation		16	Manages performance	2
			17	Conveys a sense of urge to finish the work	2
			18	Confronts people with performance problems	1
		Total			**5**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-7 continued

Level	Competency		Behavior		Frequency
Level 2	Integrity		19	Admits openly mistakes and errors	**1**
	Total in Level 2				**54**
Level 3	Commitment to Learning		1	Encourages others to learn from their activities as well as from others	3
			2	Motivates others to exceed their own limit	1
		Total			**4**
	Client Orientation		3	Promotes a climate oriented to the clients	**4**
	Results Orientation		4	Gives others liberty to decide how to do their work	**1**
	Interpersonal Communication		5	Is accessible to the others	**1**
	Total in Level 2				**10**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-8: The frequency distribution of the coded 94 behaviors in the learning journal of L8 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Seeks feedback to improve performance	6
			2	Puts into practice that learns	4
			3	Learns from own and others' experiences and mistakes	1
		Total			**11**
	Results Orientation		3	Identifies what needs to be done and acts without waiting	3
			4	Acts to avoid an imminent problem or to benefit from an immediate opportunity	2
			5	Knows when he has a problem and acts immediately	1
		Total			**6**
	Teamwork		6	Demonstrates confidence and respect for others	**4**
	Interpersonal Communication		7	Interacts with others in an open and direct manner	1
			8	Ensures that the others understand the importance of what s/he is conveying	1
		Total			**2**
	Responsiveness to Change		9	Adapts self rapidly to new situations	**2**
	Total in level 1				**25**
Level 2	Teamwork		1	Demonstrates caring leadership	7
			2	Confronts the conflicts in the team in a timely and constructive manner	7
			3	Ensures that the others have clear objectives	4
			4	Gives recognition to the contribution of others	3
			5	Creates an atmosphere of mutual trust	3
			6	Promotes communication in the team	2
			7	Facilitates the meeting	1
		Total			**29**
	Interpersonal Communication		8	Understands others' underlying needs, interests and problems	10
			9	Demonstrates tact and diplomacy	2
			10	Systematically builds consensus	2
			11	Presents logical and convincing arguments	1
		Total			**15**
	Results Orientation		12	Manages performance	6
			13	Confronts people with performance problems	3
			14	Provides timely constructive feedback	1
			15	Readily adjusts plans to achieve objectives	1
		Total			**11**
	Commitment to Learning		16	Provides a balanced view of members' strengths and weaknesses	4
			17	Provides timely and constructive feedback	2
			18	Is committed to enlisting support for members	2
			19	Asks insightful questions that facilitate the learning	1
		Total			**9**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-8- continued

Level	Competency		Behavior		Frequency
Level 2	Drive for Excellence		20	Facilitates that the others can generate ideas to make things better	**1**
	Total in Level 2				63
Level 3	Commitment to Learning		1	Encourages others to learn from their activities as well as from others	1
			2	Helps others to discover their potential	1
		Total			**2**
	Interpersonal Communication		3	Is accessible to the others	**4**
	Total in Level 2				6

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-9: The frequency distribution of the coded 64 behaviors in the learning journal of L9 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Seeks feedback to improve performance	6
			2	Strives to be competent	4
			3	Learns from own and others' experiences and mistakes	3
			4	Puts into practice that learns	1
		Total			**14**
	Teamwork		5	Demonstrates confidence and respect for others	1
			6	Is ready to make personal sacrifices	1
		Total			**2**
	Integrity		7	Assumes the responsibility of his actions	**2**
	Interpersonal Communication		8	Interacts with others in an open and direct manner	**1**
	Drive for Excellence		9	Generates new ideas that add value	**1**
	Total in level 1				**20**
Level 2	Teamwork		1	Demonstrates caring leadership	5
			2	Confronts the conflicts in the team in a timely and constructive manner	5
			3	Facilitates the meeting	3
			4	Positions self as the leader	2
			5	Gives recognition to the contribution of others	1
			6	Promotes communication in the team	1
				Ensures that the others have clear objectives	1
		Total			**18**
	Interpersonal Communication		7	Understands others' underlying needs, interests and problems	10
			8	Demonstrates tact and diplomacy	2
			9	Systematically builds consensus	2
			10	Presents logical and convincing arguments	1
		Total			**15**
	Results Orientation		11	Manages performance	6
			12	Provides timely constructive feedback	3
			13	Confronts people with performance problems	1
			14	Conveys a sense of urge to finish the work	1
		Total			**11**
	Commitment to Learning		15	Provides a balanced view of members' strengths and weaknesses	4
			16	Is committed to enlisting support for members	3
		Total			**7**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-9 continued

Level	Competency		Behavior		Frequency
Level 2	Interpersonal Communication		17	Understands others' underlying needs	3
			18	Demonstrates tact and diplomacy	1
		Total			**4**
	Drive for Excellence		19	Facilitates that the others can generate ideas to make things better	**1**
	Total in Level 2				**41**
Level 3	Commitment to Learning		1	Encourages others to learn from their activities as well as from others	**1**
	Interpersonal Communication		2	Is accessible to the others	**1**
	Client Orientation		3	Promotes a climate oriented to the clients	**1**
	Total in Level 3				**3**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-10: The frequency distribution of the coded 45 behaviors in the learning journal of L10 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Results Orientation		1	Knows when she has a problem and acts immediately	3
			2	Acts to avoid an imminent problem or to benefit from an immediate opportunity	1
		Total			**4**
	Commitment to Learning		3	Seeks feedback to improve performance	**3**
	Integrity		4	Assumes the responsibility of her actions	**1**
	Teamwork		5	Demonstrates confidence and respect for others	**1**
	Total in level 1				**9**
Level 2	Interpersonal Communication		1	Understands others' underlying needs, interests and problems	8
			2	Presents logical and convincing arguments	3
		Total			**11**
	Commitment to Learning		3	Provides a balanced view of members	6
			4	Asks insightful questions	3
			5	Provides timely and constructive feedback	1
		Total			**10**
	Results Orientation		6	Manages performance	2
			7	Confronts people with performance problems	1
		Total			**3**
	Teamwork		8	Confronts conflicts in the team	3
			9	Facilitates the meeting	2
			10	Assesses appropriate approach to lead	1
			11	Demonstrates caring leadership	1
		Total			**7**
	Total in Level 2				**31**
Level 3	Commitment to Learning		1	Looks and proposes adequate challenges	2
			2	Encourages others to learn from their activities as well as from others	1
		Total			**3**
	Integrity		3	Defends what she believes to be true	**1**
	Results Orientation		4	Demands high performance	**1**
	Total in Level 3				**5**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4B-11: The frequency distribution of the coded 14 behaviors in the learning journal of L11 across proficiency levels and competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Learns from others and own mistakes and experiences	**2**
	Integrity		2	Adjusts self rapidly to new situations	**1**
	Total in level 1				**3**
Level 2	Commitment to Learning		1	Is committed to enlisting support for members	**4**
	Results Orientation		2	Manages performance	2
			3	Confronts people with performance problems	1
			4	Manages performance	1
		Total			**4**
	Teamwork		5	Confronts conflicts in the team in a timely manner	1
			6	Gives recognition to the contribution of others	1
			7	Demonstrates caring leadership	1
		Total			**3**
	Total in Level 2				**11**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

APPENDIX 4C

THE LEADERSHIP BEHAVIORS CODED IN THE BEHAVIORAL EVENT INTERVIEW OF THE ELEVEN LEADER STUDENTS

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-1: The frequency distribution of the 80 coded behaviors in the BEI of L1 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Responsiveness to Change		1	Adapts self rapidly to new situations	4
	Results Orientation		2	Acts to avoid an imminent problem or to benefit from an immediate opportunity	2
	Teamwork		3	Demonstrates confidence and respect for others	2
	Commitment to Learning		4	Puts into practice that everything learns	1
	Integrity		5	Expresses what she thinks and feels even knowing that the message might not be well received by others	1
	Total in Level 1				**10**
Level 2	Teamwork		1	Demonstrates caring leadership	10
			2	Assesses and selects appropriate approach to lead	3
			3	Confronts conflicts in the team in a timely and constructive manner	3
			4	Creates an atmosphere mutual trust, confidence, and respect	2
			5	Positions self as the leader	2
			6	Facilitates the meetings	2
		Total			**22**
	Commitment to Learning		7	Provides a balanced view of the strengths and weaknesses of others	8
			8	Is committed to enlisting support for members	3
			9	Asks insightful questions that facilitate learning and understanding	3
			10	Provides timely and constructive feedback for development	3
			11	Calms others in new learning situations	1
			12	Facilitates that the others learn to solve the problems on their own	1
		Total			**19**
	Interpersonal Communication		13	Convince others appealing to their interests	3
			14	Demonstrates tact and diplomacy	2
			15	Understands others' underlying needs, interests, problems and motivations	1
			16	Presents logical and convincing arguments	1
		Total			**7**
	Integrity		17	Confronts immediately inappropriate behavior	3
			18	Treats others justly	2
			19	Is ready to receive feedback about her behaviors towards other people	1
			20	Acts to people who corresponds to	1
		Total			**7**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-1 continued

Level	Competency		Behavior		Frequency
Level 2	Results Orientation		21	Manages performance	2
			22	Readily adjusts the plans to achieve objectives	1
			23	Does not shy away to evaluate the work of others	1
			24	Sets challenging achievable objectives	1
		Total			**5**
	Drive for Excellence		25	Facilitates that the others can generate ideas to make things better	1
			26	Motivates others to participate in improvement activities	1
		Total			**2**
	Responsiveness to Change		27	Considers the feelings of others in periods of change	**1**
	Total in Level 2				63
Level 3	Integrity		1	Is a role model for the demonstration of organizational values	1
			2	Defends what she believes to be true and necessary even it might not be popular	1
			3	Answers the questions with good intentions	1
		Total			**3**
	Results Orientation		4	Demands high performance	1
			5	Gradually increases the responsibilities of others	1
					2
	Commitment to Learning		6	Promotes others to identify and share the best practices	**1**
	Drive for Excellence		7	Provokes in others the desire to make things every time better	**1**
	Total in Level 2				7

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-2: The frequency distribution of the 24 coded behaviors in the BEI of L2 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Interpersonal Communication		1	Interacts with others in an open and direct manner	1
			2	Knows to listen actively being primarily preoccupied for understanding	1
		Total			**2**
	Integrity		3	Expresses what she thinks and feels even knowing that the message will not well received by others	**1**
	Responsiveness to Change		4	Focuses on change with a positive attitude	**1**
	Teamwork		5	Shares all the relevant information	**1**
	Total in Level 1				**5**
Level 2	Teamwork		1	Demonstrates caring leadership	3
			2	Assesses and selects appropriate approach to lead	2
			3	Gives recognition to the contribution of others	1
			4	Involves others in the elaboration of plan of acts	1
		Total			**7**
	Interpersonal Understanding		5	Understands others' underlying needs, interests, problems and motivations	4
			6	Convince others appealing to their interests	1
		Total			**5**
	Results Orientation		7	Confronts people with performance problems	**1**
	Responsiveness to Change		8	Helps others to resolve their resistance to change	**1**
	Total in Level 2				**14**
Level 3	Teamwork		1	Maintains good relationships	**1**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-3: The frequency distribution of the 22 coded behaviors in the BEI of L3 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Teamwork		1	Offers her help when others need it	2
			2	Demonstrates confidence and respect for others	1
		Total			**3**
	Commitment to Learning		3	Puts into practice that everything learns	**1**
	Integrity		4	Expresses what she believes even knowing that the message will not well received by others	**1**
	Client Orientation		5	Maintains and establishes effective communication channels with clients	**1**
	Total in Level 1				**6**
Level 2	Teamwork		1	Demonstrates caring leadership	2
			2	Assesses and selects appropriate approach to lead	1
			3	Confronts conflicts in the team in a timely and constructive manner	1
			4	Creates an atmosphere mutual trust, confidence, and respect	1
			5	Positions self as the leader	1
			6	Gives recognition to the contribution of others	1
		Total			**7**
	Interpersonal Communication		7	Understands others' underlying needs, interests, problems and motivations	2
			8	Presents logical and convincing arguments	1
		Total			**3**
	Integrity		9	Confronts immediately inappropriate behavior	**3**
	Results Orientation		10	Manages performance	**1**
	Commitment to Learning		11	Provides a balanced view of members' strengths and weaknesses	1
			12	Is committed to enlisting support for members	1
		Total			**2**
	Total in Level 2				**16**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-4: The frequency distribution of the 39 coded behaviors in the BEI of L4 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Strives to be competent	3
			2	Shares the knowledge and experience with others	1
			3	Seeks feedback to improve the performance	1
		Total			**5**
	Responsiveness to Change		4	Focuses on changes with a positive attitude	1
			5	Adapts self rapidly to new situations	1
		Total			**2**
	Integrity		6	Assumes the responsibility of her actions, does not blame the others	**1**
	Drive for Excellence		7	Demonstrates an open mind towards new concepts, ideas and methods	**1**
	Teamwork		8	Demonstrates confidence and respect for others	**1**
	Total in Level 1				**10**
Level 2	Commitment to Learning		1	Provides a balanced view of members' strengths and weaknesses	4
			2	Facilitates the others learn to solve the problems on their own	2
			3	Provides timely and constructive feedback	1
			4	Asks insightful questions	1
			5	Is committed to enlisting support for others	1
		Total			**9**
	Teamwork		6	Demonstrates caring leadership	2
			7	Involves others in the elaboration of plan of acts	2
			8	Confronts conflicts in a timely constructive manner	2
			9	Positions self as the leader	1
		Total			**7**
	Results Orientation		10	Confronts people with performance problems	2
			11	Manages performance	2
			12	Holds people accountable for their performance	1
		Total			**5**
	Interpersonal Communication		13	Understands others underlying needs, interests, problems and motivations	**2**
	Responsiveness to Change		14	Helps others to understand the reasons of change and how it will affect them	2
			15	Helps others to resolve their resistance to change	1
		Total			**3**
	Integrity		16	Confronts immediately inappropriate behavior	**1**
	Client Orientation		17	Keeps in mind the client when taking decisions	**1**
	Total in Level 2				**28**
Level 3	Responsiveness to Change		1	Transmits optimism about the positive outcomes of change	**1**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-5: The frequency distribution of the 15 coded behaviors in the BEI of L5 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Learns from own and others' experiences	2
			2	Seeks feedback to improve the performance	1
		Total			**3**
	Total in Level 1				**3**
Level 2	Commitment to Learning		1	Demonstrates caring leadership	2
			2	Confronts conflicts in a timely constructive manner	2
			3	Positions self as the leader	1
			4	Assesses appropriate approach to lead	1
		Total			**6**
	Teamwork		5	Convince others appealing to their interests	2
			6	Understands others underlying needs, interests, problems and motivations	1
		Total			**3**
	Commitment to Learning		7	Provides a balanced view of members' strengths and weaknesses	1
			8	Provides timely constructive feedback	1
		Total			**2**
	Drive for Excellence		9	Demonstrates a positive attitude to be able to do the things	**1**
	Total in Level 2				**12**

Appendix 4C-6: The frequency distribution of the 12 coded behaviors in BEI of L6 across proficiency levels, competences and behavioral descriptors

Level	Competency	Behavior		Frequency
Level 1	Commitment to Learning	1	Is willing and open to receive feedback	1
	Client Orientation	2	Treats clients kindly and respectively	1
	Total in level 1			**2**
Level 2	Commitment to Learning	1	Provides a balanced view of members' strengths and weaknesses	5
	Results Orientation	2	Does not shy away to evaluate the work of others	1
		3	Confronts people with performance problems	1
	Teamwork	4	Demonstrates caring leadership	2
	Total in Level 2			**9**
Level 3	Commitment to Learning	1	Helps others to discover their capacities and potentials	1
	Total in Level 3			**1**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-7: The frequency distribution of the 20 coded behaviors in the BEI of L7 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Integrity		1	Assumes the responsibility of her actions, does not blame the others	2
			2	Tells the truth	1
		Total			**3**
	Responsiveness to Change		3	Adapts self rapidly to new situations	**2**
	Commitment to Learning		4	Sees setbacks as a chance to improve	**1**
	Total in Level 1				**6**
Level 2	Teamwork		1	Demonstrates caring leadership	3
			2	Creates at atmosphere of mutual trust and confidence	2
			3	Confronts conflicts in a timely manner	1
		Total			**6**
	Interpersonal Communication		4	Understands others underlying needs, interests, problems and motivations	5
			5	Convince others appealing to their interests	1
		Total			**6**
	Results Orientation		6	Confronts people with performance problems	**1**
	Commitment to Learning		7	Provides a balanced view of team members' strengths and weaknesses	**1**
	Total in Level 2				**14**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-8: The frequency distribution of the 14 coded behaviors in the BEI of L8 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Shares the knowledge and experience with others	1
			2	Learns from own and others' mistakes and experiences	1
		Total			**2**
	Total in Level 1				**2**
Level 2	Results Orientation		1	Confronts people with performance problems	2
			2	Conveys a sense of urge to finish the work	1
			3	Manages performance	1
			4	Does not shy away to evaluate the work of others	1
			5	Holds people accountable for their performance	1
		Total			**6**
	Commitment to Learning		6	Provides a balanced view of members' strengths and weaknesses	1
			7	Provides timely constructive feedback	1
			8	Is committed to enlisting support for members	1
		Total			**3**
	Interpersonal Communication		9	Understands others' underlying needs, interests, problems	**1**
	Teamwork		10	Involves others in elaboration of plan of acts	**2**
	Total in Level 2				**12**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-9: The frequency distribution of the 20 coded behaviors in the BEI of L9 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Integrity		1	Tells the truth	2
			2	Assumes the responsibility of her actions, does not blame the others	1
		Total			**3**
	Commitment to Learning		3	Learns from own and others' experiences	**3**
	Interpersonal Communication		4	Interacts with others in an open and direct manner	**1**
	Client Orientation		5	Before acting, look to understand the needs and expectations of clients	**1**
	Total in Level 1				**8**
Level 2	Commitment to Learning		1	Is committed to enlisting support for others	4
			2	Provides a balanced view of members' strengths and weaknesses	2
		Total			**6**
	Interpersonal Communication		3	Understands others underlying needs, interests, problems and motivations	**5**
	Results Orientation		4	Does not shy away to evaluate the work of others	**1**
	Total in Level 2				**12**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4C-10: The frequency distribution of the 23 coded behaviors in the BEI of L10 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency		Behavior		Frequency
Level 1	Commitment to Learning		1	Shares the knowledge and experience with others	1
	Client Orientation		2	Responds adequately to clients' questions, requests, and complaints	1
	Total in Level 1				**2**
Level 2	Commitment to Learning		1	Provides a balanced view of members' strengths and weaknesses	2
			2	Facilitates the others learn to solve the problems on their own	1
			3	Provides timely and constructive feedback	1
			4	Is committed to enlisting support for others	1
		Total			**5**
	Teamwork		5	Creates an atmosphere of mutual trust and respect	5
			6	Assesses and selects appropriate approach to lead	2
			7	Demonstrates caring leadership	2
			8	Promotes communication in the team	1
		Total			**10**
	Interpersonal Communication		9	Understands others underlying needs, interests, problems and motivations	4
			10	Convince others appealing to their interests	1
		Total			**5**
	Total in Level 2				**20**
Level 3	Responsiveness to Change		1	Is accessible to the others	**1**

Appendix 4C-11: The frequency distribution of the 4 coded behaviors in the BEI of L11 across leadership proficiency levels, competences, and behavioral descriptors

Level	Competency	Behavior		Frequency
Level 1	Results Orientation	1	Persists to achieve objectives	2
	Total in Level 1			**2**
Level 2	Interpersonal Communication	1	Convince others appealing to their interests	1
	Results Orientation	2	Conveys a sense of urge to finish the work	1
	Total in Level 2			**2**

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

APPENDIX 4D

THE LEADERSHIP BEHAVIORS

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4D-1: Mann-Whitney Test examining the differences on mean number of leadership behaviors between the first and the second academic semester

	Behavior
Mann-Whitney U	3687.000
Wilcoxon W	11815.000
Z	-1.375
Asymp. Sig. (2-tailed)	0.169

a. Grouping Variable: semester

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4D-2: The leadership behaviors identified in the learning journals at level 2 in descending order

	Frequency	Cumulative Percent
Demonstrates caring leadership	123	13.5
Understands others' underlying needs, interests, problems, and motivations	114	26.0
Provides a balanced view of members' strengths and weaknesses	102	37.2
Manages performance	65	44.3
Is committed to enlisting support for members	44	49.1
Confronts people with performance problems	39	53.4
Confronts conflicts in the team in a timely and constructive manner	37	57.5
Assesses and selects appropriate approach to lead	30	60.7
Asks insightful questions that facilitate learning and understanding	25	63.5
Facilitates the meeting	25	66.2
Demonstrates a positive attitude to be able to do things	24	68.9
Positions self as the leader	23	71.4
Gives recognition to the contribution of others	21	73.7
Creates an atmosphere of mutual trust and confidence and respect	20	75.9
Calms others in new learning situations	18	77.9
Presents logical and convincing arguments	17	79.7
Demonstrates tact and diplomacy	17	81.6
Provides timely and constructive feedback for personal development	16	83.3
Ensures that the others have clear objectives, expectations and responsibilities	16	85.1
Conveys a sense of urge to finish the work or solve the problems	15	86.7
Convince others appealing to their interests	14	88.3
Provides constructive timely feedback	14	89.8
Promotes communication in the team	13	91.2
Facilitates that the others can generate ideas to make things better	12	92.5
Confronts immediately inappropriate behaviour	12	93.9
Holds people accountable for their performance	12	95.2
Systematically build consensus and support for his/her vision and focus	10	96.3

ISBN:978-84-693-5423-0/DL:T-1414-2010

	Frequency	Cumulative Percent
Readily adjusts plans to achieve objectives	10	97.4
Motivates others to participate in improvement activities	4	97.8
Treats others justly	4	98.2
Does not shy away to evaluate the work of others	3	98.6
Facilitates that the others learn to solve the problems on their own	2	98.8
Admits openly mistakes and errors	2	99.0
Corrects rapidly the problems in client service without becoming defensive	2	99.2
Involves others in the elaboration of plans of acts	2	99.5
Runs calculated risks when implementing new ideas	1	99.6
Communicates with clients in a proactive, regular and systematic manner to determine their needs	1	99.7
Actively seeks to make things better for clients	1	99.8
Involve others in the planification of change implementation	1	99.9
Helps others to resolve their resistance to change	1	100.0
Total	912	

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4D-3: The leadership behaviors identified in the behavioural event interviews at level 2 in descending order

	Frequency	Cumulative Percent
Provides a balanced view of members' strengths and weaknesses	26	12.6
Demonstrates caring leadership	26	25.2
Understands others' underlying needs, interests, problems, and motivations	25	37.4
Is committed to enlisting support for members	11	42.7
Creates an atmosphere of mutual trust and confidence and respect	10	47.6
Provides timely and constructive feedback for personal development	9	51.9
Convince others appealing to their interests	9	56.3
Confronts conflicts in the team in a timely and constructive manner	9	60.7
Assesses and selects appropriate approach to lead	9	65.0
Confronts immediately inappropriate behaviour	7	68.4
Confronts people with performance problems	7	71.8
Manages performance	6	74.8
Asks insightful questions that facilitate learning and understanding	5	77.2
Involves others in the elaboration of plans of acts	5	79.6
Positions self as the leader	5	82.0
Facilitates that the others learn to solve the problems on their own	4	84.0
Does not shy away to evaluate the work of others	4	85.9
Presents logical and convincing arguments	2	86.9
Demonstrates tact and diplomacy	2	87.9
Treats others justly	2	88.8
Conveys a sense of urge to finish the work or solve the problems	2	89.8
Holds people accountable for their performance	2	90.8
Helps others to understand the reasons of change and how it will affect them	2	91.7
Helps others to resolve their resistance to change	2	92.7
Gives recognition to the contribution of others	2	93.7

ISBN:978-84-693-5423-0/DL:T-1414-2010

	Frequency	Cumulative Percent
Facilitates the meeting	2	94.7
Calms others in new learning situations	1	95.1
Demonstrates a positive attitude to be able to do things	1	95.6
Facilitates that the others can generate ideas to make things better	1	96.1
Motivates others to participate in improvement activities	1	96.6
Is ready to receive feedback about his/her behaviours towards other people	1	97.1
Acts to people who really corresponds to	1	97.6
Establishes challenging achievable objectives	1	98.1
Readily adjusts plans to achieve objectives	1	98.5
Keeps in mind the client when taking decisions	1	99.0
Considers the feelings of others in periods of change	1	99.5
Promotes communication in the team	1	100.0
Total	206	

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EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4D-4: Descriptive statistics and the normality of the study variables

Variable		Mean	*SD*	P (Shapiro-Wilk)	Z-skewness	Z-kurtosis
Team Performance (N=23)		7.30	0.45		0.51	0.04
Team Performance (N=10)						
Leadership Learning		7.15	0.99		-1.62	0.29
Number of leadership behaviors identified in the learning journals	Level 1	24.90	14.26	**0.04**[a]	1.94	0.70
	Level 2	90.10	67.57	**0.01**[a]	3.13	3.95
	Level 3	11.60	13.24	**0.00**[a]	3.21	3.59
Number of leadership behaviors identified in the BEIs	Level 1	5.40	3.17	0.13	0.51	-1.02
	Level 2	20.40	15.92	**0.00**[a]	3.72	5.23
	Level 3	1.10	2.13	**0.00**[a]	4.15	6.40
Diversity of leadership behaviors identified in the learning journals	Level 1	9.40	2.92	0.75	0.69	0.18
	Level 2	21.60	6.42	0.62	0.19	0.52
Diversity of leadership behaviors identified in the BEIs	Level 1	4.00	2.00	**0.04**[b]	0.91	0.06
	Level 2	10.80	6.84	**0.04**[b]	2.38	2.33

Note: "a" indicates improvement in distribution of data following log-transformation; "b" indicates the variables for which Spearman's rank correlation coefficients were used

The descriptive statistics for study variables are displayed above and the variables that violated the assumption of normality ($p < 0.05$) are highlighted in bold. Those variables, as indicated by the sign of z-score, were positively skewed hence logarithmic transformation (base 10) were applied to drive data into the normality (Wheater and Cook, 2000).

After the log-transformation the skewness of the distribution of the number of leadership behaviors identified in the learning journals and in the BEIs was greatly improved and the data approximated a normal distribution ($p > 0.05$). However, the diversity of behaviors identified in the BEIs remained non-normally distributed ($p < 0.05$). Due to the non-normal distribution of these data, it was most appropriate to use non-parametric tests and therefore Spearman's rank correlation coefficients were used.

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

APPENDIX 4E

THE EFFECT OF THE LEADER STUDENTS' PROFILE ON TEAM AND LEADERSHIP PERFORMANCE

Gender

Managerial styles

Higher order value types

MBTI types

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
Sibel Özgen
ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4E-1: The Effect of Gender on Team and Leadership Performance

Independent t-tests have been performed to examine whether there were gender differences in the *leadership performance* (leadership learning, number and diversity of leadership behaviors, and members' perception of leadership effectiveness). The results are displayed in Table 1.

It can be seen that the mean scores for the leadership performance variables were generally higher in the group of female leaders than in the group of male leaders.

In fact, the test results revealed statistically significant gender differences in leadership learning (See Table 1). Therefore, it seems that female leader students learned more leadership in the PMP class (M = 7.51, $SD = 0.98$) than their male counterparts (M = 6.66, $SD = 0.90$), $t(22) = 2.21$, $p < 0.05$ and it represented a medium sized effect $r = 0.43$, two-tailed

However, the results also revealed that there were no significant differences between male and female leader students in terms of the number and diversity of leadership behaviors demonstrated at level 2 (as identified both in learning journals and BEIs) and the members' perception of leadership effectiveness. That is to say, these variables did not vary significantly between leaders' gender (all p values > 0.05), but generally represented a medium sized effect (r ranging between 0.44 and 0.21), two-tailed.

ISBN:978-84-693-5423-0/DL:T-1414-2010

Table 1: Means, standard deviations, test of homogeneity of variances (Levene's Test), and the results of t-test for equality of leadership performance variable means according to the gender of the leader students

Variables	Groups	*M*	*SD*	Levene's Test for equality of variances		T-test for equality of means		
				F	*Sig.*	t	*df*	*Sig.*
Leadership Learning a	Female	7.51	0.98	0.02	0.88	2.21	22	**0.04**
	Male	6.67	0.90					
Number of behaviors in LJ at level 2 [b]	Female	104.17	89.59	4.05	0.08	1.15	9	0.28
	Male	57.40	13.01					
Number of behaviors in LJ at level 2 [b]	Female	24.50	20.66	4.22	0.07	1.34	9	0.20
	Male	11.80	1.79					
Diversity of behaviors in LJ at level 2 [b]	Female	21.66	10.27	12.28	0.07	0.66	9	0.53
	Male	18.60	1.67					
Diversity of behaviors in BEI at level 2 [b]	Female	12.67	8.57	2.77	0.13	1.46	9	0.18
	Male	6.80	2.78					
Members' perception effectiveness [b]	Female	3.81	0.29	2.85	0.61	0.95	9	0.37
	Male	3.62	0.37					

Note: "b" N = 24 (12 female, 12 male), "c" N = 11 (6 female, 5 male)

"LJ" = Learning Journal, "BEI" = Behavioral Event Interview, two-tailed significance values are reported

* $p < 0.05$ level

UNIVERSITAT ROVIRA I VIRGILI
EXPLORATORY SEARCH FOR RELEVANT FEATURES OF THE IMPACT OF LEADERSHIP ON TEAM PERFORMANCE
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ISBN:978-84-693-5423-0/DL:T-1414-2010

Appendix 4E-2: The Effect of Leader Students' Perceived Managerial Styles on Leadership Performance

The leader students' perceived managerial styles have been identified to investigate its effect on leadership performance.

Table 2 presents the sample size in each study variable in relation to leadership performance. It can be seen that the sample size was very small in each managerial style category. Therefore, statistical procedures have not been carried out since no conclusive results could be drawn with the available sample. However, the mean performance variables have been calculated and are presented in Figure 1 and Figure 2 to have a descriptive view.

Table 2: Sample size for the leadership performance variables studied according to the leader students' perceived managerial styles

Managerial Style	**Number of leader students**	
	Leadership Performance Variables	
	Leadership Learning	Leadership behaviors and member' perceptions
Coercive	2	1
Authoritative	5	2
Affiliative	8	4
Democratic	3	1
Pacesetting	2	2
Coaching	1	0
Mixed [a]	3	1
N_T	24	11

"a" Means that those leader students had equal preferences for two different managerial styles

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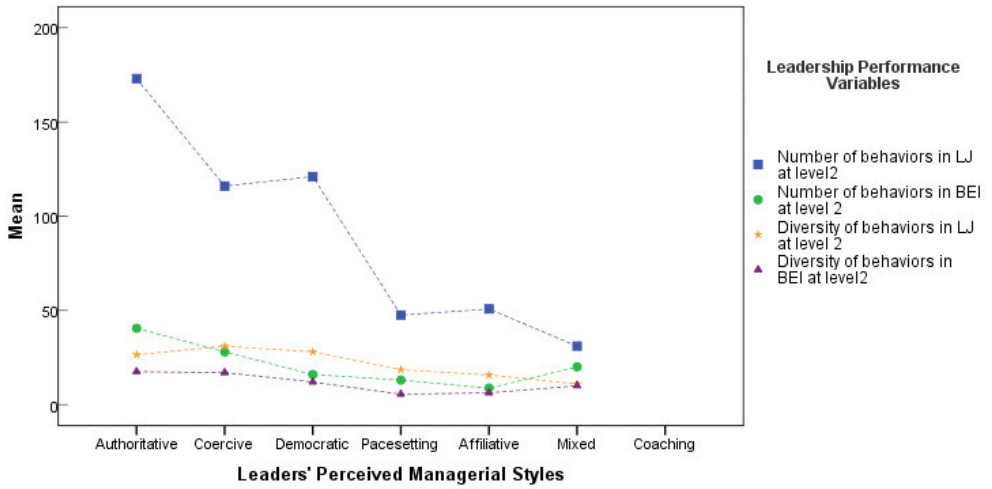

Figure 1: The mean number and diversity leadership behaviors identified in learning journals and in behavioural event interviews at level 2 and the mean ratings of leadership performance sorted-out by the leader students' perceived managerial styles

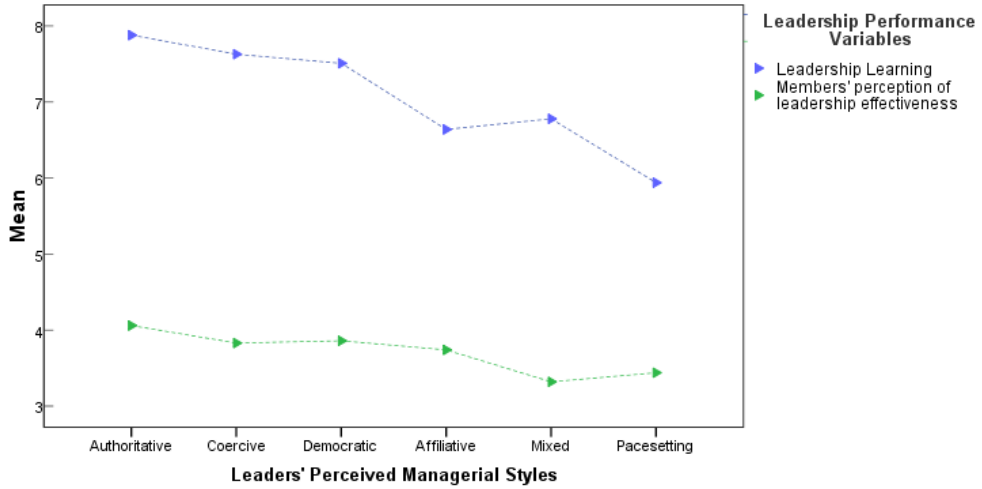

Figure 2: The mean leadership learning and members' perception of leadership effectiveness according to the leader students' perceived managerial styles

UNIVERSITAT ROVIRA I VIRGILI
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Looking at Figure 1, it seemed that the "authoritative" leader students learned more leadership in the PMP course and the "pacesetting" and "mixed" (who have equal preferences for more than one managerial style) students seemed to learn less leadership in comparison to the others.

Looking at Figure 2, it appeared that the mean leadership learning was highest in the group of "authoritative" leaders and was lowest in the groups of "pacesetting" leaders.

It shall be noted that these are not conclusive results they may just show the trends. This analysis should be repeated with a larger sample to reach conclusions.

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Appendix 4E-3: The Effect of Leaders' Values on Leadership Performance

To examine relationships between Schwartz higher order value types (self-transcendence, conservation, self-enhancement and plus hedonism value) and study variables, correlation coefficients have been computed. Prior to correlation analyses, data have been checked for normality and the hedonism data showed substantial negative skew (Table 3).

To correct this, the data were first reflected by subtracting each score from one plus the highest score in the distribution, then were log-transformed and then were reflected again (Field, 2005; Munro, 2005). After confirming the normality of the data, those transformed scores have been used in all subsequent analyses.

The results of the correlation analyses are displayed in Table 4. It worths noting that hedonism value correlated negatively with all the leadership performance variables. These correlations were **not** statistically significant. Yet, they suggest an inverse relationship between leadership performance and hedonism.

This finding is quite understandable because the individuals who give priority to hedonism value are likely to work only as much as needed (Bauer and Taylor, 2001). Therefore, it might be possible that the leader students, who engaged more in hedonistic activities, exerted the minimum effort required to learn leadership and to lead and manage their teams.

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Table 3: Descriptive statistics for the Schwartz higher order value types and hedonism value

Variable	Mean	*SD*	P (Shapiro-Wilk)	Z-skewness	Z-kurtosis
For N = 24					
Self-transcendence	0.20	0.47	0.07	-0.31	-1.50
Conservation	-0.30	0.65	0.14	-1.45	-0.15
Self-enhancement	-0.38	0.50	0.84	-0.02	-0.47
Openness to Change	0.36	0.75	0.33	-0.70	-0.55
Hedonism	0.32	1.41	**0.01**	-4.37	6.45
For N = 23					
Self-transcendence	0.18	0.46	0.12	-0.14	-1.44
Conservation	-0.32	0.66	0.21	-1.28	-0.27
Self-enhancement	-0.36	0.11	0.77	-0.19	-0.46
Openness to Change	0.36	0.76	0.27	-0.73	-0.65
Hedonism	0.36	1.43	**0.00**	-4.48	6.60
For N = 11					
Self-transcendence	0.04	0.50	0.24	0.53	-1.06
Conservation	-0.09	0.48	0.21	-0.78	-0.09
Self-enhancement	-0.51	0.59	0.56	0.57	-0.43
Openness to Change	0.34	0.75	0.22	-1.02	-0.42
Hedonism	0.29	1.07	0.36	-1.23	0.03

UNIVERSITAT ROVIRA I VIRGILI
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Table 4: Correlation coefficients for the relationships between Schwartz higher values and hedonism value and team and leadership performance. Associated significance values are presented in parentheses

Study Variables	**Leadership Performance**											
	Leadership Learning (N=24)		Number of leadership behaviors at level 2 in (N=11)				Diversity of leadership behaviors at level 2 (N=11)				Members' perception of leadership effectiveness (N=11)	
			LJ		BEI		LJ		BEI [a]			
Self-transcendence	0.32	(0.13)	0.08	(0.81)	0.01	(0.98)	0.28	(0.41)	0.17	(0.61)	0.40	(0.23)
Conservation	-0.06	(0.78)	0.20	(0.57)	-0.04	(0.92)	0.06	(0.86)	0.08	(0.81)	0.28	(0.41)
Self-enhancement	-0.01	(0.95)	-0.28	(0.41)	-0.08	(0.81)	-0.30	(0.37)	-0.33	(0.32)	-0.15	(0.65)
Openness to change	0.06	(0.78)	-0.13	(0.71)	0.17	(0.61)	-0.19	(0.59)	0.06	(0.87)	-0.20	(0.57)
Hedonism value	-0.33	(0.12)	-0.44	(0.17)	-0.28	(0.41)	-0.50	(0.12)	-0.49	(0.12)	-0.51	(0.10)

Note: Values are corrected for scale use. Sample size ranges between 11and 24. Tests of significance were two-tailed. **Bold** characters represent statistically significant correlations.

"a" Spearman rank correlation coefficient

** $p < 0.01$

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Non-significant, moderate to near zero correlations were found between leaders' higher order value types (i.e. self-transcendence, conservation, self-enhancement, and openness to change) and leadership performance variables.

Especially striking was the finding that, though statistically non significant, **self-transcendence** correlated positively with all leadership performance variables whereas **self-enhancement** showed negative correlations with those variables (Table 4).

This is understandable because self-transcendence and self-enhancement are contrasting values. The former emphasizes concern for the well-fare and interests of others whereas the latter emphasizes the pursuit of one's own interests and relative success and dominance over others (Schwartz, 2006; p.10).

Therefore, it might be said that the leader students' values which promote the welfare of others tended to positively relate to the leadership performance. The leader students' values which promote self-interests tended to inversely correlate with leadership performance.

This finding is in accord with the previous literature which stated that authentic transformational leaders are concerned with the welfare of others (Bass & Steidlmeier, 1999) and that authentic leaders have values that emphasize the collective interests of their groups or organizations (Howell & Avolio, 1992). A cross-cultural study by Sarros and Santora (2001) revealed that the executives who had values such as benevolence (a self-transcendence value) and who retained the need for success were closely associated with transformational leadership behaviors.

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Appendix 4E-4: The Effect of Leaders' MBTI Types on Leadership Performance

Leaders' MBTI types have been identified to study its effect on leadership performance

Table 5 presents the sample size in each study variable in relation to leadership. It can be seen that the sample size was very small in each MBTI type. Therefore, statistical procedures have not been carried out since no conclusive results could be drawn with the available sample. However, the mean performance variables have been calculated and are presented in Figure 3 and Figure 4 to have a descriptive view.

Table 5: Sample size for the leadership performance variables studied according to the leader students' perceived managerial styles

Managerial Style	**Number of leader students** Leadership Performance	
	Leadership Learning	Leadership behaviors and member' perceptions
ENTJ	1	-
ISTP	2	1
ESTJ	9	3
ESTP	2	2
ENTP	1	-
ISTJ	5	4
INTJ	4	1
N_T	24	11

The means for leadership variables have been calculated for students' MBTI types (Figure 3 and 4). It seemed from Figure 3 that the diversity of leadership behaviors and members' perception of leadership effectiveness did not vary across students' MBTI types. It seemed that ISTJs had higher number of leadership behaviors identified in their journal at level 2.

It appeared from Figure 4 that INTJs had the highest leadership learning among other types. It shall be noted that these are not conclusive results they may just show the trends. This analysis should be repeated with a larger sample to reach conclusions.

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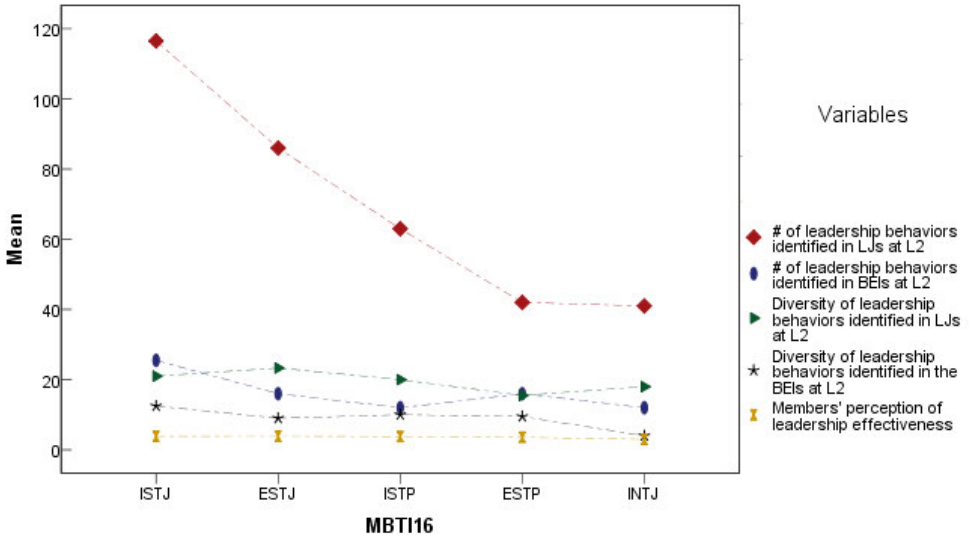

Figure 3: The mean number and diversity of leadership behaviors identified at team leadership level according to leader students' MBTI types

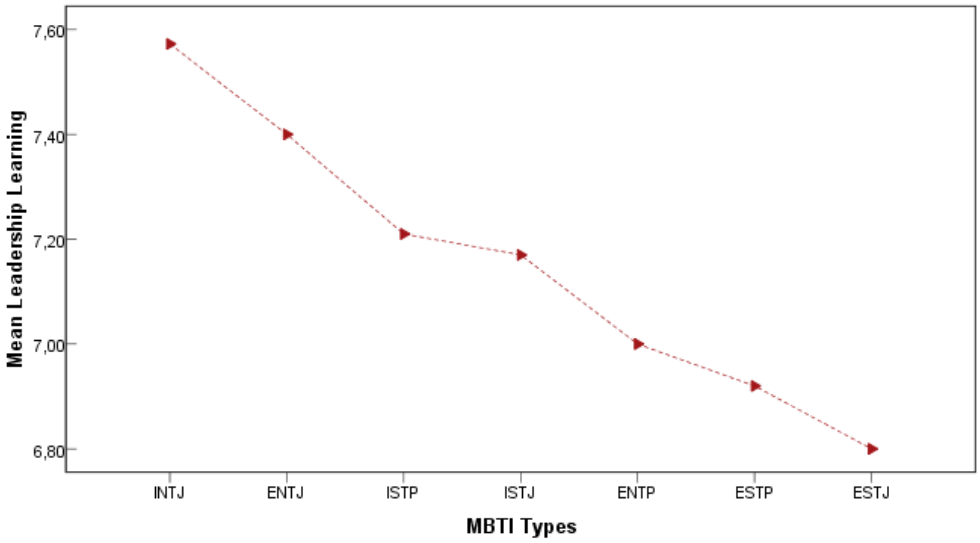

Figure 4: The mean leadership performance according to the leader students' MBTI types

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Correlation coefficients have been computed between 4 MBTI continuous scale scores (E-I, S-N, T-F, and J-P) and leadership performance variable to determine whether relationships existed between those.

The results of these computations are set forth in Table 6. Since the raw scores on the MBTI were converted to continuous scores on four scales, the correlations resulted in positive correlation coefficients in relationships between introversion, intuition, feeling, and perceiving and negative correlation coefficients in relationships between extroversion, sensing, thinking and judging.

The J-P continuum had significant correlations with the members' perception of leadership effectiveness ($r_s = 0.79$, $p < 0.05$, two-tailed). That is to say, team members tended to perceive judging leaders to be more effective than perceiving leaders. This finding is in agreement with previous studies. For instance, Berr *et al.* (2000) reported that a preference for judging was significantly positively correlated with direct-report ratings of managerial effectiveness. Similarly, Schneider et al. (2002, as cited in Zaccaro et al., 2004) reported that a preference for judging was associated with teacher and peer ratings of leadership in a sample of high school students.

The results demonstrated that there were no significant relationships between E-I continuum and leadership performance variables. Likewise, the S-N continuum did not show any significant correlations with the study variables.

UNIVERSITAT ROVIRA I VIRGILI
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Sibel Özgen
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Table 6: Correlation coefficients for the relationships between four MBTI continuous scale scores and team and leadership performance. Associated significance values are presented in parenthesis

Study Variables	**Leadership Performance**											
	Leadership Learning (N=24)		Number of leadership behaviors at level 2 in (N=11)				Diversity of leadership behaviors at level 2 (N=11)				Members' perception of leadership effectiveness (N=11)	
			LJ		BEI		LJ		BEI [a]			
E-I scale	0.27	(0.19)	0.23	(0.50)	0.15	(0.67)	0.20	(0.55)	0.13	(0.71)	0.18	(0.60)
S-N scale	0.34	(0.10)	-0.20	(0.50)	0.05	(0.88)	-0.24	(0.47)	-0.01	(0.99)	-0.58	(0.06)
T-F scale	-0.21	(0.31)	-0.56	(0.10)	-0.45	(0.20)	-0.58	(0.06)	-0.39	(0.23)	-0.57	(0.07)
J-P scale	-0.17	(0.44)	**-0.71*** [a]	(0.01)	-0.44[a]	(0.18)	-0.57[a]	(0.07)	-0.27	(0.43)	**-0.79*** [a]	(0.04)

Note: Continuous scale scores are used for correlation analyses. Sample size ranges between 11and 24. Tests of significance were two-tailed. **Bold** characters represent statistically significant correlations.

"E-I" = Extroversion-Introversion, "S-N" = Sensing-Intuition", T-F" = Thinking-Feeling, "J-P" = Judging-Perceiving.

Positive correlation coefficients refer to the I, N, F, and P dimensions of each of the MBTI scales, and negative correlations refer to the E, S, T, and J dimensions.

"a" Spearman rank correlation coefficient, others are Pearson correlation coefficient.

* $p < 0.05$

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Appendix 4E-5: The Normality of Leadership Performance Variables

Variable		P (Shapiro-Wilk)	Z-skewness	Z-kurtosis
Leadership Learning	G1	0.99	-0.49	0.21
	G2	0.99	0.60	0.20
Number of behaviors in LJ	G1	0.05	2.19	2.07
	G2	0.98	0.39	0.21
Number of behaviors in BEI	G1	**0.02**	2.38	2.43
	G2	0.56	-1.11	0.79
Diversity of behaviors in LJ	G1	0.67	-0.34	-0.27
	G2	0.90	-0.20	0.67
Diversity of behaviors in BEI	G1	0.06	1.83	1.04
	G2	0.27	0.61	-1.18
Members' perception	G1	0.24	-1.12	1.58
	G2	0.06	-2.04	-1.18

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APPENDIX 4F

THE EFFECT OF TEAM BALANCE ON TEAM PERFORMANCE

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Appendix 4F-1: Unrepresented team roles in project teams according to Belbin's basic concept

Team	Number of Unrepresented Roles	Unrepresented Role(s)
1	1	RI
2	1	ME
3	1	CO
4	2	PL-RI
5	1	RI
6	-	-
7	1	CO
8	-	-
9	3	CO-RI-ME
10	1	PL
11	-	-
12	1	RI
13	1	ME
14	3	PL-RI-ME
15	1	RI
16	1	RI
17	1	CO
18	1	CO

Appendix 4F-2: Normality of team performance by team balance as identified by Belbin's basic concept

	M	SD	Z_{skew}	$Z_{kurtosis}$	p (SW)
Balanced Teams (N=3)	7.06	0.24	0.79	-	0.6
Unbalanced Teams (N=15)	7.32	0.49	0.10	0.20	0.5

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Appendix 4F-3: Normality of team performance by team balance as identified by Senior's first measure of balance

	M	SD	Z skew	Z kurtosis	*p* (SW)
Balanced Teams (N=8)	7.16	0.37	-0.55	-0.70	0.5
Unbalanced Teams (N=10)	7.38	0.52	0.26	0.37	0.7

Appendix 4F-4: Normality of the number of team roles represented at different score criteria

	M	SD	Z skew	Z kurtosis	*p* (SW)
70-score criterion	3.83	1.95	0.09	-0.87	0.25
80-score criterion	3.28	1.49	-0.78	0.22	0.49
90-score criterion	3.56	1.62	-0.21	-0.01	**0.04**
Log-transformed 90-score criterion (reflected)	0.34	0.24	0.05	-0.76	**0.02**

Appendix 4F-5: Descriptive data about the three balance indexes

	M	SD	Z skew	Z kurtosis	*p* (SW)
TBI1	41.84	8.12	-0.73	-0.73	0.97
TBI2	91.61	6.71	0.00	0.09	-0.83
TBI3	48.71	7.09	0.84	-0.33	-0.52

Appendix 4F-6: Descriptive data about the number of team members in each team according to their interaction types (N = 10 teams)

Interacts	M	SD	Z skew	Z kurtosis	*p* (SW)
Neither harmoniously nor productively (T1)	0.80	0.63	0.19	0.13	**0.01**
Harmoniously but not productively (T2)	1.40	1.07	0.47	-0.66	0.18
Both harmoniously and productively (T3)	3.60	1.07	-0.47	-0.66	0.18
Transformed (T1)	0.23	0.17	-0.79	-0.68	0.01