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Abstract

The study investigated whether students perceive their university instructors in a virtual learning environment as leaders. Referring to the full range leadership theory (FRLT), we examined the effects of transformational and passive leadership styles of university instructors on students' satisfaction and learning outcomes. Completed web-based questionnaires were obtained from 1270 students who enrolled in large academic courses led by instructors in web-based instructional environments. Data analyses confirmed the validity of the multifactor leadership questionnaire (MLQ) in the virtual asynchronous communication setting with three second-order factors model composed of transformational, active management-by-exception and passive leadership. Leadership styles correlated with student satisfaction: the more the students attributed transformational leadership style to the instructor and the less they attributed a passive leadership style, the more satisfied they were. The attributed leadership style was not related to the actual participation of the students in the virtual discussions or to their academic achievements. The findings suggest that subordinates' satisfaction might be tied more strongly to their perception of the leader than to the actual tangible benefits the leader can provide. Moreover, the study shows that the FRLT is applied to the asynchronous, web-based, instructional environment which is being increasingly adopted in higher education institutions.

Keywords

full range leadership theory, higher education, instructors, satisfaction, transformational leadership, web-based environment

Introduction

A class of students and their class master are in nature a small organization that may be studied and managed by theories of organization and management. (Cheng, 1994:69)

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Most leadership studies are conducted in business organizations (Avolio et al., 1999), a few examine leadership in educational settings (Koh et al., 1995) and only a handful looked at this phenomenon in higher education institutions (Pounder, 2008a). To the best of our knowledge, the existing research has neither attempted to examine the leadership perceptions of students toward their instructors, nor has it applied to the pervasive communication channel that characterizes the instructor–student interaction, namely – the virtual. Therefore, our primary goal in the present research is to explore whether students (followers) are able to identify the leadership style of their instructors (leaders) when the communication is virtual and asynchronous. Furthermore, we aim at scrutinizing the effects of students' perceptions regarding their instructors' transformational, transactional and laissez-faire leadership styles on their learning outcomes and on their satisfaction from their studies. More specifically, we aim at discovering which of the full range leadership theory (FRLT) dimensions (Sivasubramaniam et al., 2002) emerges in the context of virtual, Internet-based situations. Is it feasible to perceive leadership style established in face-to-face interactions in the context of Internet-based systems, where communication between leaders and followers is virtual?

First, we review the current literature on leadership in the higher education context. We then present our empirical study in which we examined the structure of leadership in the context of Internet-based communication between university instructors and students and the effects of the leadership styles on students' satisfaction and learning outcomes.

Leadership in university settings

Few researchers have investigated the *leadership* role of *teachers* or *instructors* (the terms are used hereafter interchangeably) in educational systems (Cheng, 1994; Leithwood and Jantzi, 2006; Leithwood et al., 2009). Among those researchers, only a minority (Harris, 2003; Pounder, 2008a) has looked into the higher education systems where the instructor–student interaction can be viewed in a leadership context. One such study is Weaver and Qi's (2005: 579), who assert that 'college classroom, like any other workplace, is a social organization where power is asserted, tasks are assigned and negotiated, and work is accomplished through the interplay of formal and informal social structures'. Hence, the instructor usually 'leads' the class, and is responsible for determining the components of the syllabus that covers the content of the lessons, the list of readings and the criteria to evaluate students' performance (Weaver and Qi, 2005: 573).

In the academic setting, the instructors' role is not limited to transferring knowledge. Instructors are perceived as experts and as such, they are expected to stimulate students' curiosity, respond to their academic needs and aspirations, and act as role models. Such a behaviour represents a transformational type of leadership (Bass, 1985). Pounder (2008a) attempted to explain the role of transformational leadership in the classroom context, stating that one can conceive the classroom as a small social organization where the teacher functions as a leader and the students represent the followers. The instructors are expected to lead the students to achieve personal and collective goals defined by individuals (teaching staff, students) and the organization (the school). Transformational leadership is one of the three leadership styles that compose the FRLT that was developed by Bass (1985), and was later refined by Bass and Avolio (1990, 1995, 1997). Yukl (2010:263) wrote that 'transforming leadership appeals to the moral values of followers in an attempt to raise their consciousness about ethical issue.' The two other leadership styles that compose the FRLT are transactional leadership and laissez-faire. Yukl (2010: 263) suggested that 'Transactional leadership motivates followers by appealing to their self-interest and exchanging benefits.'

Laissez-faire reflects 'passive indifference' about the task and the followers, and is usually referred to as 'the absence of effective leadership' (Yukl, 2010: 279).

Among the three styles, transformational leadership received most attention in relation to research in higher education institutions. Such an effort was made by Pounder (2008a, 2008b, 2009), who argues that there is a lack of research examining 'the applicability of the transformational leadership notions to an instructional setting' (2003: 8). One of the pioneering studies utilizing transformational leadership in the context of higher education arena was Ojode et al.'s research (1999, in Pounder, 2003:9), which was based on the multifactor leadership questionnaire (MLQ) that measures the FRLT. This tool was modified to an instructional context in order to examine the perceptions of 57 graduate students who evaluated four faculty members in one US university. The study findings showed positive associations between instructor's effectiveness and transformational leadership style. Later on, Pounder (2008a) looked at the relationship between the dimensions of transformational leadership and individual and organizational outcomes. He found positive correlations among the five dimensions of transformational leadership and three classroom outcomes: students' extra effort; instructor's effectiveness; and students' satisfaction with the instructor.

Leadership in virtual environment

Increasingly, more organizational interactions are conducted over the Internet, where subordinates only rarely meet their superiors face-to-face. This tendency is accompanied by a growing interest in the effects of leadership styles on followers' outcomes in a context that is not based on a face-to-face interaction – the 'natural state' for leadership behaviour (for a thorough review, see Avolio et al., 2009). Up to now, the validity of the distinction between transformational and transactional leadership styles has been tested widely in the context of face-to-face interactions (Antonakis et al., 2003; Bass, 1998; Den Hartog and Van Muijen, 1997).

The bulk of research on virtual leadership has been conducted in the laboratory, where 'virtual' teams (Bell and Kozlowski, 2002) and individual leadership styles are manipulated in order to study the effects of various exogenous variables, such as communication modalities of media richness (Fletcher and Major, 2006; Hambley et al., 2007b), efficacy measures, trust in leader and value congruence (Hoyt and Blascovich, 2003) on team interaction styles and performance. One such example is the study carried out by Kahai et al. (2003) who examined the effects of leadership style (transformational/transactional) that are transacted via different levels of anonymity (identified/anonymous interaction) on creativity-relevant group processes and outcomes. Another study, conducted by Hambley et al. (2007b), investigated the effects of transformational and transactional leadership styles and teams' means of communication (face-to-face, desktop videoconference or text-based chat) on team interaction styles and outcomes in a computer laboratory simulating an office environment (that is, cubicles). In a different study conducted by Hambley et al. (2007a), a semi-structured interview was used to study virtual team leadership in a range of organizations using qualitative data. One of the main findings in their interview data was that contrary to face-to-face leaders, virtual leaders need to exhibit their leadership behaviour more profoundly in order to substitute the potential risk of impersonal virtual teamwork communication by more personal communication.

With the increased use of computer-mediated communication, research has focused on the effects of the various computer-mediated forms of interaction on leader–follower interaction and on organizational outcomes (Motiwalla and Tello, 2000). In a laboratory study with college

students, Purvanova and Bono (2009) found that transformational leadership had a stronger effect on team performance in teams that used computer-mediated communication as compared to face-to-face teams. Additionally, computer-mediated communication teams whose leaders increased their transformational leadership behaviours achieved the highest levels of overall team performance. These findings led the researchers to suggest that 'transformational leadership behaviours are especially instrumental to team performance under the more ambiguous communication conditions created by electronic communication media' (Purvanova and Bono, 2009: 352).

The above studies raise the need for further investigation of the impact of mediated communication on perceived leadership styles. Consequently, the question emerges whether the same leadership styles perceived in face-to-face interactions are perceived via virtual communication.

Referring to higher education settings, previous research on instructional, text-based environments (Garrison et al., 2000; Garrison and Anderson, 2003) found that the lack of physical, face-to-face contact in web-based interactions did not inhibit students from experiencing the presence of the instructor in the course (for recent review of such findings see Gorsky et al., 2010). However, under these circumstances, the nature of the leadership style might take a different form from the face-to-face social context. For example, an instructor might exhibit his/her leadership behaviour more blatantly. We attempted to answer the question whether theories of leadership, developed in the context of face-to-face business interactions, are valid in the framework of educational web-based discussion groups. The past decade has witnessed a significant expansion of asynchronous learning networks (Dziuban et al., 2007; Sun et al., 2008). Faculty members incorporate online communication in a hybrid teaching model, where in-class oral dialogues are supported by online, distance out-of-class, written communication (Bonk and Graham, 2006; Garrison and Vaughan, 2008). Incorporating online communication does not entail a change in teachers' attitude toward teaching as they still hold the same conceptions regarding their role definition. That is, instructors continue to lead their students to achieve personal and collective goals defined by the individuals (teaching staff, students) and the organization (the school). Consequently, their behaviour may affect students' outcomes (for example, satisfaction, organizational citizenship behaviour) in online environment in a very similar way to that found in face-to-face environments.

Following our goal to examine whether leadership style in face-to-face interactions is feasible in the context of Internet-based systems, we propose the following hypothesis:

Hypothesis 1: The overall structure of the MLQ will be replicated when perception of the leader is based on computer-mediated asynchronous communication.

To test the study hypotheses, we employed a questionnaire that examined the perceptions of students toward their instructors who led web-based discussion groups rather than conducting a laboratory or a field study (Yoo and Alavi, 2004).

Leadership styles and student's satisfaction in a virtual environment

We examined the validity of the leadership style model in additional way, by examining its relationships with student's satisfaction. Extensive research on leadership indicates that transformational leadership and contingent reward are positively related to job satisfaction whereas management-by exception (active/passive) and laissez-faire are negatively related to satisfaction (Judge and Piccolo, 2004). Replication of these relationships in the distant learning environment

will provide further support that leadership can be exerted without face-to-face encounters. The leadership style of university instructors may have a profound effect on students' learning and performance (Carbonaro, 2005). The instructor's online leadership behaviour is exhibited in a number of ways that are characteristic of the transformational leadership, and may have an effect on student satisfaction: leveraging opportunities for students to ask questions, extending students' reliance on the instructor to receive clear and specific answers, expanding the degree to which the instructor can inspire the students to achieve higher order expectations than previously defined, and increasing the extent to which students feel that their concerns are being taken care of. Student satisfaction from e-learning has been studied by a number of researchers (see Table 1 in Sun et al.'s study [2008]). Among the factors that were identified as relating to the instructor were the instructor's 'response timeliness' and 'attitude toward e-Learning'. Leadership behaviour was not included in previous research models. Our current study is intended to shed some light on this unexplored research area: the relationship between leadership style and student level of satisfaction in an asynchronous, web-based, instructional environment.

Hypotheses

Based on the face-to-face leadership literature (Pounder 2008a), we expected transformational leadership to correlate positively with student satisfaction: *charismatic and inspirational* instructors motivate students to be involved with the course material, not merely to study for achieving high grades; *individual consideration* is likely to help students feel that they are not alone when trying to overcome academic obstacles, and *intellectual stimulation* is intrinsically tied to the very essence of academic studies.

Following the acknowledgment of transformational leadership's contribution to creating a 'responsive and innovative environment' (Silins, 1994: 274), we hypothesize that:

Hypothesis 2: Instructors' transformational leadership behaviors will be positively correlated with student satisfaction.

We expected to reveal a distinction between two aspects of transactional leadership: contingent reward and management-by-exception (MbE). *Contingent reward* has been found in previous research to be positively associated with transformational leadership (Den Hartog and Van Muijen, 1997; Turner et al., 2000). In Judge and Piccolo's (2004: 761) study, transformational leadership was strongly correlated (0.80) with contingent reward. It is assumed that leaders who attach a set of rewards to specific goals that are defined a priori to their followers can expect to have a positive impact on the followers' feeling of job satisfaction.

We anticipated *contingent reward* to be positively related to student satisfaction because it provides stability and structure to the learning experience. In contrast, we expected *management by exception* to be negatively related to satisfaction, because in a social context, where there is no face-to-face interaction with the instructor, students are likely to interpret this leadership style as denoting lack of involvement and interest in the course. For the same reason, we anticipated a negative relationship between the *laissez-faire* style and satisfaction.

Taken together, we propose the following hypotheses:

Hypothesis 3: Contingent reward behaviour is positively associated with student satisfaction.

Hypothesis 4: Management by exception behaviour (active or passive) is negatively associated with student satisfaction.

Table 1. Means, Standard Deviations and Correlations of Study Variables.

	Means (SD)	Passive L.	LF	MbeP	MbeA	Trans. L.	Cont. reward	Ideal. attrib	Ideal. behav	Insp. motiv	Ind consid	Int. stimul	Gen. Satis	Task Satis.	Soc. Satis	Partici- pation	Grade
Passive L.	1.37 (0.86)																
LF	1.24 (0.90)	0.892 ^{***}															
MbeP	1.49 (1.01)	0.916 ^{***}	0.636 ^{***}														
MbeA	2.10 (1.10)	0.306 ^{***}	0.181 ^{***}	0.363 ^{***}													
Trans. L.	2.46 (0.89)	-0.231 ^{***}	-0.280 ^{***}	-0.145 ^{***}	0.289 ^{***}												
Cont. reward	2.75 (0.91)	-0.184 ^{***}	-0.275 ^{***}	-0.071 ^{***}	0.287 ^{***}	0.857 ^{***}											
Ideal. Attrib	2.75 (0.98)	-0.259 ^{***}	-0.286 ^{***}	-0.189 ^{***}	0.222 ^{***}	0.900 ^{***}	0.728 ^{***}										
Ideal. behav	2.21 (1.01)	-0.119 [*]	-0.160 ^{***}	-0.060 ^{***}	0.299 ^{***}	0.839 ^{***}	0.700 ^{***}	0.666 ^{***}									
Insp. motiv	2.34 (1.06)	-0.213 ^{***}	-0.276 ^{***}	-0.119 [*]	0.290 ^{***}	0.912 ^{***}	0.766 ^{***}	0.781 ^{***}	0.764 ^{***}								
Ind consid	2.40 (1.06)	-0.252 ^{***}	-0.275 ^{***}	-0.186 ^{***}	0.200 ^{***}	0.914 ^{***}	0.716 ^{***}	0.813 ^{***}	0.685 ^{***}	0.789 ^{***}							
Int. stimul	2.26 (1.02)	-0.161 ^{***}	-0.195 ^{***}	-0.102 [*]	0.269 ^{***}	0.867 ^{***}	0.690 ^{***}	0.722 ^{***}	0.680 ^{***}	0.749 ^{***}	0.764 ^{***}						
Gen. Satis	3.77 (1.09)	-0.385 ^{***}	-0.415 ^{***}	-0.288 ^{***}	0.091 ^{***}	0.694 ^{***}	0.623 ^{***}	0.656 ^{***}	0.529 ^{***}	0.623 ^{***}	0.637 ^{***}	0.609 ^{***}					
Task Satis.	2.82 (0.91)	-0.426 ^{***}	-0.448 ^{***}	-0.329 ^{***}	0.128 ^{***}	0.632 ^{***}	0.596 ^{***}	0.614 ^{***}	0.481 ^{***}	0.551 ^{***}	0.591 ^{***}	0.509 ^{***}	0.734 ^{***}				
Soc. Satis	2.54 (1.07)	-0.323 ^{***}	-0.381 ^{***}	-0.213 ^{***}	0.156 ^{***}	0.672 ^{***}	0.627 ^{***}	0.535 ^{***}	0.535 ^{***}	0.614 ^{***}	0.609 ^{***}	0.552 ^{***}	0.724 ^{***}	0.797 ^{***}			
Partici- pation	6.88 (1.14)	0.026	0.057	-0.006	0.000	-0.051	-0.105	-0.003	-0.015	-0.067	-0.059	-0.031	-0.044	-0.034	-0.067		
Grade	82.6 (9.18)	-0.130 [*]	-0.106	-0.127 [*]	-0.109	-0.035	-0.048	-0.003	-0.065	-0.040	-0.005	-0.038	0.101	0.109	0.070	0.129 [*]	

Notes: $r > \pm .13$ are significant at $p < 0.001$; $r = \pm .13$ are significant at $p < 0.05$; $r < \pm .13$ are not significant; LF: laissez-faire. MbEP: management-by-exception – Passive. MbEA: management-by-exception – Active.

Hypothesis 5: Laissez-faire behaviour is negatively associated with student satisfaction.

Additionally, we wanted to explore whether perceived leadership styles predict student satisfaction above and beyond students' actual assistance from the leader. We expected students' assistance from the leader to affect the relationship between instructor leadership style and student satisfaction and academic achievements. However, instead of inquiring about the more abstract 'need for leadership,' we tested the impact of the more concrete subjective evaluation of 'actual assistance' as a crucial factor that could affect students' contentment in their studies. We assumed that students' evaluation of the extent to which they obtained guidance, instruction and inspiration would have an influence on their satisfaction. Therefore, our goal was to examine whether instructor leadership style could predict student satisfaction above and beyond the subjective evaluation of the assistance they obtained from the leader.

With regard to academic achievements, we expected leadership style to affect this organizational output as transformational leadership and contingent reward could provide the motivation needed for inspiring students to academic success. As for passive management-by-exception and laissez-faire, we expected that these leadership styles might discourage students from investing time and mental effort in their studies, leading to inability to fulfil their original expectations for academic success.

Hypothesis 6: Instructor leadership styles will predict student satisfaction and academic achievements above and beyond students' need for assistance.

Method

Background and participants

The Open University of Israel is a distance education university designed to offer academic studies to Hebrew speaking students, mainly Israeli residents. The university offers a home study system based on textbooks, instructors and study centres throughout the country. University courses offer either 'regular' bi-weekly or 'intensive' weekly lessons. The classic text-instructor system is enriched with a web-based instructional environment wherein each course has its own website. These sites are intended to enrich students' learning opportunities and to increase both instructor–student and student–student interactions. Website use and face-to-face instructor-led lessons are non-mandatory and do not replace textbooks, which are the pedagogical foundations of the Open University. In some course websites, one instructor leads the discussion group. In other courses, more than one instructor take responsibility for this role.

An invitation to participate in the study was posted on the websites 2 weeks prior to the final exams of 29 large academic courses, which had a range of 200 to 3256 students. In order to increase participation rate, 10 prizes of NIS100 each (~US\$25) were offered by casting lots among all student participants. Data collection lasted for one week. Completed web-based questionnaires were obtained from 1270 students. Participants ranged in age from 15 to 57 ($M = 27$, $SD = 6$). Females comprised 57 per cent of the sample.

Measures

Multifactor leadership questionnaire (MLQ). The MLQ (Form 5) is a widely used instrument that assesses *transformational* and *transactional* leadership. As indicated by Brown and Keeping

(2005: 245), '[o]ver the past 25 years, the construct of transformational leadership has gained enormous popularity among both researchers and practitioners'. The MLQ was validated in a number of studies (Bass et al., 2003; Lowe et al., 1996; Muenjohn and Armstrong, 2008), and was employed in business organizations (Avolio et al., 1999; Berson and Linton, 2005; Tejeda et al., 2001; Tracey and Hinkin, 1998), educational systems (Koh et al., 1995) and military units (Yammarino et al., 1993).

We adopted Bass's (1985) typology, which refers to three main types of leadership: transformational, transactional and laissez-faire. *Transformational leadership* occurs 'when one or more persons engage with others in such a way that leaders and followers raise one another to higher levels of motivation and morality' (Burns, 1978: 20). *Transactional leadership* refers to exchange relationships between the leaders and their followers where each enters the transaction because of the expectation to fulfil self-interests, and the leader is responsible for maintaining the status quo by satisfying the needs of the followers. *Laissez-faire* is distinguished from the other two styles because it is perceived as a failure to take responsibility for managing. Leaders who adopt this type of behaviour avoid providing direction and support, show lack of caring for what the followers do, and bury themselves in busy work (Bass, 1998).

Bass and Avolio (1997) identified five subfactors of transformational leadership: *Idealized influence – attributed* – the socialized charisma of the leader; *idealized influence – behaviour* – the actual actions taken by the leader to bring people to follow his or her vision; *individual consideration* – paying personal attention; *inspirational motivation* – energizing the followers by viewing the future with optimism and stressing ambitious goals; and *intellectual stimulation* – motivating people to think of innovative and extraordinary solutions to problems. Two subfactors have been identified in transactional leadership: *Contingent reward* – rewarding people upon completing an agreed-upon task, a characteristic that is closely related to transformational leadership (Judge and Piccolo, 2004; Silins, 1992); and *management by exception*, either *active* or *passive* – responding when things go wrong. It should be noted that the MLQ has gained impressive statistical results in several countries and different contexts (Bass, 1997; Dvir and Shamir, 2003), though in a recent study (Leong and Fischer, 2011), a significant variability was found between countries in reported transformational leadership using Schwartz's and Hofstede's dimensions of cultural variability.

We used the Hebrew version of the MLQ form 5 (Bass and Avolio, 1995). The MLQ reflects the followers' *perceptions* of the leader's behaviour. Hence, whether the context is face-to-face or virtual, the evaluation of the leader – the instructor – needs to be measured as perceived by the followers – the students. The 36 items of the MLQ were slightly adapted in order to capture the nature of asynchronous virtual communication. First, we instructed students to evaluate one of the instructors who participated in the discussion group in the course. If there was more than one instructor, the students were instructed to choose one of them and to evaluate this instructor through the whole questionnaire. Second, we used the word 'students' instead of 'followers' or 'workers' that appeared in most of the original MLQ versions. Third, we replaced the term 'leader' with the term 'instructor'. Fourth, we added to the original five-point scale ranging from 0 (*almost never*) to 4 (*always*) another response option – 9 – *I can not evaluate*. This option was added due to the non-tangible nature of student–instructor relations in a distance learning system. We use the frequency of choosing this option as a validity measure of the questionnaire.

Leader assistance. To measure assistance, we adapted the unidimensional need for leadership questionnaire that was developed by de Vries et al. (2002). Instead of stating 'I need my supervisor

to ...', we asked the respondents to refer to the following statement: 'I am assisted by my instructor in order to ...' when responding to the 17 items of the scale ranging from 0 (*not at all*) to 4 (*a lot*). The internal reliability coefficient of the current version was 0.91.

Satisfaction. Participants rated the extent of their satisfaction with the performance of the course staff in the discussion group. Participants were asked to rate the extent to which the instructor was engaged in activities that contributed to the discussion group on a scale from 0 (*never*) to 4 (*usually or always*). Three items measured contributions to learning tasks (for example, 'helps in understanding the course material'; $\alpha = 0.86$), and three measured contributions to the social climate (for example, 'establishes good relationship with the students'; $\alpha = 0.87$). In addition, we asked one general question about job satisfaction: 'To what extent are you satisfied with the faculty's action in the discussion group?' Means, standard deviations and correlations of satisfaction measures are provided in Table 1, which presents the descriptive statistics of all the study variables.

Participation. The posting to the discussion group is a measure of the actual participation of the student in the course. As indicated, participation in the discussion group was not mandatory, and gave no academic credit. This measure was obtained from the web-based instructional environment log files. Based on these log files, we found that 27 per cent of the students did not participate at all, 43 per cent participated to a minimal degree (posted once, twice or three times), and the remaining 30 per cent participated more intensively: some of them posted up to 20 messages during the semester. The log files allow us to compare these data to students who did not respond to the questionnaire. Of the students enrolled in the sampled courses, 76 per cent never participated in the posting, 13 per cent participated to a minimal degree, and the remaining 11 per cent participated more intensively. In terms of representation, our sample is biased toward students who actively participated. We have no data regarding 'passive' participation (reading without posting).

Academic achievements. We obtained the final grades of each of the participating students from the university database. This information was merged with the data of the research by the use of codes that ensured the protection of the privacy of the students. The student's final grades was used as a measure of academic achievement ($M = 82.6$, $SD = 9.18$).

Results

MLQ: inability to answer

Our first validity measure of the MLQ to asynchronous instructional environment was students' inability to evaluate the instructors. Table 2 presents these data according to the 9 factors' model. An extreme case is item number 2, 'instructors re-examine critical assumptions to question whether they are appropriate,' to which almost half the students were unable to respond. Eight items had to be excluded from the analysis due to a high non-response (more than 20 per cent) resulting from inability to evaluate the item or missing data. One factor, *inspirational motivation*, remained with two items, while all other factors included three or more items each.

A total of 427 students answered all 28 items of MLQ (after the omission of the eight items with the high per centage of non-response) and served as a sample to test the MLQ. Of these students, 293 reported that they had never met the targeted instructor face-to-face.

Table 2. Inability to answer.

Item number	Factor		'I can not evaluate' (%)	Missing data (%)	Total
5	Laissez-faire		2.4	1.1	3.5
7			1.5	1.3	2.8
28			22.5	2.4	24.9
33			3.3	2.6	5.9
3	Transactional leadership	Management by exception passive	5.4	0.7	6.1
12			16.9	1.7	7.6
17			33.6	2.4	36.0
20			9.9	2.5	12.4
4		Management by exception active	5.8	1.1	6.9
22			7.6	2.0	9.6
24			32.0	2.4	34.4
27			13.9	2.9	16.8
1		Contingent reward	8.9	0.5	9.4
11			24.2	1.7	25.9
16			5.8	2.2	8.0
35			12.1	2.8	14.9
10	Transformational Leadership	Idealized influence attributed	8.9	1.3	10.16
18			14.0	2.1	16.1
21			6.8	2.0	8.8
25			7.2	2.8	10.0
6		Idealized influence behavior	11.4	0.9	12.3
14			6.1	2.3	8.4
23			28.1	2.1	30.2
34			13.5	2.9	16.4
9		Inspirational motivation	34.5	1.1	35.6
13			16.9	1.7	18.6
26			18.9	2.7	21.6
36			15.6	3.1	18.7
15		Individual consideration	3.9	2.0	5.9
19			5.3	2.2	7.5
29			11.0	2.4	13.4
31			12.2	2.1	14.3
2		Intellectual stimulation	48.5	0.9	49.4
8			10.0	1.1	11.1
30			3.7	2.6	6.3
32			3.3	2.4	5.7

Note: Items in which more than 20 percent of the participants marked the 'I can not evaluate' option (bold)

Examination of the differences between these 427 students that were included vs. all other students who were excluded from the sample revealed significant differences in two out of all the study variables, including the background ones: participation and number of completed courses. Those who were excluded from the sample completed less courses than those included ($M = 7.51$ versus 8.34 , respectively), and posted more messages in the discussion group ($M = 7.94$ versus 5.40 , respectively), both at $p < 0.05$. Hence, we conducted the study with the reduced sample.

MLQ: confirmatory factor analysis

To examine the factor structure of the MLQ, we tested several first-order and second-order correlated models that were examined in the past (for example, Antonakis et al. [2003] who tested several structures of the MLQ). Table 3 presents the analysis after splitting the data into two groups: students who had met the instructor and students who had not. Analysis of the questionnaire structure over the whole sample resulted in very similar results. We offered a revised model that has relatively better fit and was also supported by a Multidimensional Scaling Analysis, as captured graphically in Figure 1. In this model, laissez-faire and passive management-by-exception are lower-order variables of a factor named 'passive leadership'. Active management-by-exception stands as a single factor, while contingent reward is included as another first-order variable composing the transformational leadership factor. Internal consistencies (Cronbach's α) are 0.83, 0.42 and 0.95 for passive leadership, active management-by-exception and transformational leadership, respectively. Active management-by-exception includes three items and its internal consistency value is very low. Consequently, the validity of Hypothesis 4, which relates to active management-by-exception, is dubious.

The confirmatory factor analysis showed that the nine factors first-order model as well as our revised second-order model had the best fit. These observations were confirmed by significant chi-square tests, testing the differences in fit between the models (see Table 3, right column). We concluded that the MLQ's structure validity remained stable even when the leadership was virtual. Consequently, Hypothesis 1 was supported. The items of the MLQ were found to suit the computer-mediated asynchronous communication where leadership is virtual.

Correlations between leadership style, satisfaction, participation and achievements

Table 1 presents correlations among all nine first-order factors, as well as the two other second-order factors (passive leadership and active management-by-exception): satisfaction, participation and achievement. Passive leadership correlated negatively with all measures of satisfaction thus supporting Hypotheses 4 (with reference to passive management-by-exception) and 5. Transformational leadership correlated positively with all these measures, supporting Hypotheses 2 and 3 since contingent reward was included in the transformational leadership style. Active management-by-exception, which was reported earlier as having a low internal consistency, was found to have weak correlations (if any) with all measures. None of the leadership styles correlated with participation in the discussion group. Achievements correlated very weakly with the second order factor of Passive Leadership and the lower order factor of passive management-by-exception.¹

Correlations between leader assistance, satisfaction, participation, and achievements

Leader assistance ($M = 2.78$, $SD = 0.84$) correlated positively with all measures of satisfaction: General satisfaction ($r = 0.37$), task ($r = 0.38$) and social ($r = 0.34$, all p 's < 0.001). However, leader assistance did not correlate with either participation in the discussion group ($r = 0.06$) or with final grades ($r = 0.01$). Significant correlations were found between leader assistance and passive leadership ($r = -0.12$, $p < 0.05$), with active management-by-exception ($r = 0.15$, $p < 0.01$), and with transformational leadership ($r = 0.42$, $p < 0.001$).

Table 3. Fit indices for multiple samples (Met instructor, $n = 134$; Did not meet, $n = 293$).

Model cut-off	χ^2 , df ^a	χ^2/df	Comparative fit index (CFI)	Root mean square error of approximation (RMSEA)	Model comparison ^b χ^2 , (df), p	Fit difference between models $\Delta\chi^2$, df ^a
	< 2	$>= 0.90$	$>= 0.90$	$<= 0.08$		
First-order models						
Antonakis (Model 3) 3 factors	2214.87, 774	2.86	0.73	0.067	99.04 (26), 1.0	873.66, 72
Antonakis (Model 4) 3 factors	1737.65, 774	2.25	0.85	0.055	23.95, (26), 0.58	396.44, 72
Heinitz 3 factors	304.94, 134	2.28	0.90	0.056	11.93, (10), 0.29	1036.27, 568
Antonakis (Model 5) 6 factors	1545.49, 747	2.07	0.88	0.051	21.10, (23), 0.58	204.28, 45
Antonakis (Model 6) 7 factors	1522.31, 735	2.07	0.88	0.051	21.66, (21), 0.42	181.1, 33
Antonakis (Model 7) 8 factors	1417.58, 719	1.97	0.90	0.049	21.98, (21), 0.40	76.37, 17
Antonakis (Model 8) 8 factors	1448.21, 719	2.01	0.89	0.050	19.00, (21), 0.59	107, 17
Antonakis (Model 9) 9 factors ^c	1341.21, 702	1.92	0.90	0.047	15.34, (20), 0.76	
Second-order models						
Avolio 3 second-order factors (transformational, developmental/transformational, corrective avoidant) ^d	1569.35, 756	2.076	0.88	0.051	18.91, (22), 0.65	72.42, 4
3 second-order factors (transformational, transactional, laissez-faire)	1900.55	752	2.53	0.061	16.61, (20), 0.68	403.62, 0
3 second-order factors (transformational, transactional, and passive leadership) based on Antonakis Model 6.	1590.11, 756	2.10	0.87	0.052	16.74, (22), 0.78	93.18, 4
3 second-order factors (transformational, transactional, and passive leadership) based on Antonakis Model 7.	1583.43, 753	2.10	0.88	0.052	18.90, (21), 0.59	86.50, 1
3 second-order factors (transformational, transactional, and passive leadership) based on Antonakis Model 8.	1649.42, 758	2.18	0.87	0.053	18.67, (21), 0.61	152.49, 6
3 second-order factors (transformational, transactional, and passive leadership) ^e on MBEA, and passive leadership	1496.93, 752	1.99	0.89	0.049	15.67, (20), 0.73	

Notes: ^aAll chi-square tests are significant at $p < 0.001$ level; ^btested against the unconstrained model; ^cAntonakis (Model 9) served as reference model for testing the first-order models; ^dwe tested a full correlated model instead of a partial correlated model proposed by Avolio et al. (1999); ^eTransformational leadership includes the contingent reward. This model served as reference model for testing the second-order models; Antonakis refers to the model tested in Antonakis et al. (2003); Heinitz refers to the model proposed by Heinitz et al. (2005); Avolio refers to Avolio et al. (1999).

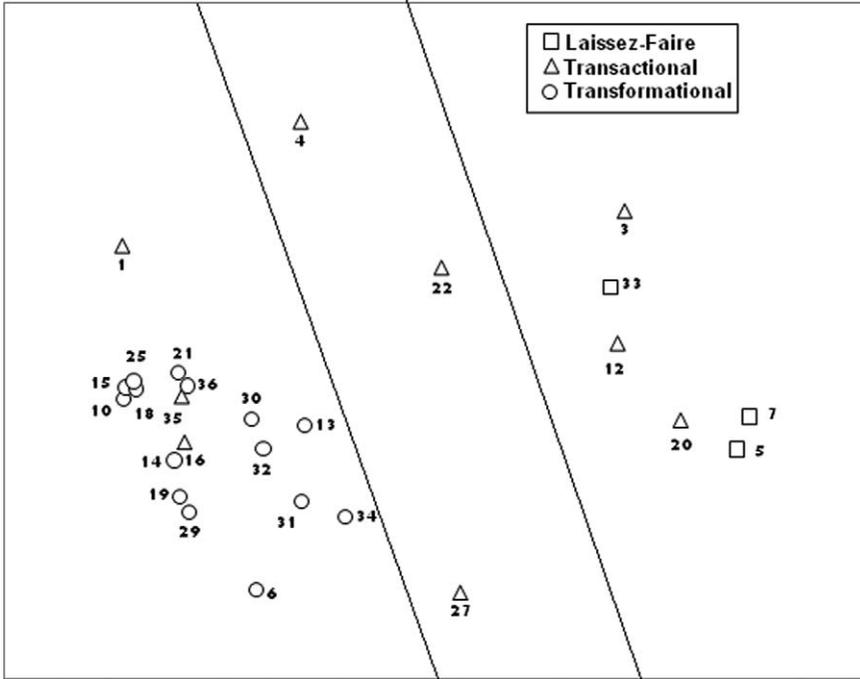


Figure 1. Map of Multidimensional Scaling. Numbers correspond to the MLQ items (see Table 2).

Given these results, we tested whether leadership style predicted satisfaction above and beyond leader assistance. We tested this by several hierarchical regressions. As noted above, leader assistance predicted general satisfaction ($R^2 = 0.14$). Adding passive leadership as a predictor resulted in a significant change in R^2 [$\Delta R^2 = 0.18$, $F(1,415) = 65.30$, $p > 0.001$, β (leader assistance) = 0.32, β (passive leadership) = -0.34]. Adding transformational leadership as a predictor resulted in even more remarkable change in R^2 [$\Delta R^2 = 0.35$, $F(1,415) = 284.26$, $p > 0.001$, β (leader assistance) = 0.09, β (transformational leadership) = 0.65]. However, adding active management-by-exception as a predictor did not result in a significant change in R^2 ($\Delta R^2 = 0.00$, $F(1,415) < 1$). (As indicated before, this variable had a low internal consistency.) We repeated this analysis for the other measures of satisfaction. The results are presented in Table 4.

Based on the above findings, we confirmed Hypothesis 6, which asserts that instructors' leadership style will predict student satisfaction and academic achievements above and beyond the assistance the students receive from their leader.

Discussion

In the virtual setting, many of the status symbols that accompany face-to-face leadership are attenuated. This is particularly evident in the educational setting where the leadership status of an instructor is clearly recognized in a face-to-face interaction in the classroom. The instructor stands at the front of a room of seated students and has control over the space and the allocation of time for

Table 4. Hierarchical regressions testing the additive effect of leadership styles.

	added predictor	ΔR^2	F(change)	df	β (leader assistance)	β (added predictor)
General satisfaction R^2 (leader assistance) = 0.14	Passive leadership	0.18	65.30**	1,415	0.32**	-0.34**
	MbEA	0.00	0.54 ^a	1,415	0.37**	0.04 ^a
	Transformational leadership	0.35	284.26**	1,415	0.09*	0.65**
Task satisfaction R^2 (leader assistance) = 0.14	Passive leadership	0.18	86.07**	1,417	0.33**	-0.39**
	MbEA	0.01	2.47 ^a	1,417	0.37**	0.07 ^a
	Transformational leadership	0.27	193.87**	1,417	0.17**	0.58**
Social satisfaction R^2 (leader assistance) = 0.12	Passive leadership	0.08	41.73**	1,417	0.31**	-0.29**
	MbEA	0.01	5.23*	1,417	0.33**	0.10*
	Transformational leadership	0.39	258.90**	1,417	0.07 ^a	0.64**

Notes: ^aNot significant; * $p < 0.05$; ** $p < 0.001$.

students' participation. In contrast, in an asynchronous web-based instructional environment, the hierarchy is much less pronounced. The instructor has almost no control over the extent of time and space students have to express their thoughts. A small visible icon might be the only status symbol that is associated with his/her name. Is it really possible to identify leadership behaviours under these conditions of virtual interaction? Findings of the present study suggest that the web-based leadership, as depicted by the MLQ, is indeed possible.

Leadership in a virtual setting

We examined whether the MLQ, one of the most influential measures of leadership currently used, can be applied to a setting in which the interaction with the leader is based on his or her written messages in instructional discussion groups. The first piece of evidence in support of the applicability of the MLQ to the virtual setting is direct: we added an option to the response scale which enables explicit reporting that an item is meaningless. Participants chose this option only for a relatively small proportion of the items. More importantly, for eight out of the nine scales of the MLQ scales, a single item at the most was judged as meaningless by a large proportion of participants. Thus, after excluding the items that were regarded as meaningless in an online interaction, the MLQ still included enough items defined a priori as assessing each of the core dimensions of the theory. In sum, participants found the MLQ applicable to the setting of a virtual instructional environment, though it was not fully replicated.

Our second step was to examine the structure of the MLQ. We used two confirmatory data analysis techniques: multidimensional scaling and confirmatory factor analysis. Both methods provided support of the structure of the MLQ. However, findings point to a possible alternative model, in which the MLQ scales are consolidated in three higher order dimensions that differ somewhat from the original structure of the MLQ, mainly a result of ungrouping the transactional leadership construct: A dimension consisting of passive management-by-exception and laissez-faire, which we named 'passive leadership'; a dimension consisting of active management-by-exception scale

only; and a dimension including all the subscales of transformational leadership and contingent reward.

We interpret the three dimensions as differing in the degree of involvement of the online instructor: from almost complete passivity in the first dimension to proactive involvement in the learning process of the students in the third dimension. Consequently, our findings suggest that students react more to the instructor's level of involvement rather than to the type of motivation that generated it. As long as the instructor's reaction is perceived as passive, students would not be concerned whether it was originated from a general *laissez-faire* style or from a behaviour that focuses on reacting only when something goes wrong (passive management-by-exception). We suggest that this is an important characteristic of online-mediated leadership, since the reasons for writing a message, for example, are not clearly known. Moreover, the attributed subtext meaning of a specific message depends largely on an image generated in the readers' mind. This is a testable hypothesis for future research.

Furthermore, the findings that leadership style is meaningfully correlated with student satisfaction corroborate Hambley et al.'s (2007b) results. They found no interaction between leadership styles and communication media, suggesting that the message is more essential than the medium. In an era, where organizational operation is supported more heavily by computer-mediated communication, the message for leaders is that leadership abilities are not filtered out by the medium and can be still effectively transferred to the followers.

Our study focused on leadership in an academic context, and it remains to be seen whether this case can be generalized to other social contexts. The 'virtual' environment differs from the face-to-face environment in the visibility of the actors. In a face-to-face setting, a person can be silent, but his or her presence may be still perceived as influential in the room. In contrast, in the virtual environment, those who are not actively involved (for example, participating in a discussion group) are literally absent (Caspi et al., 2006). Nonetheless, the mere presence or absence of instructors in the virtual environment may be interpreted in terms of their leadership style. While an instructor can not be absent in a classroom, he/she can write zero messages in a discussion group or write to a minimal degree. The students' expectations regarding the participation of the instructor in a discussion group may define the perceived leadership style attributed to such behaviour. In that sense, perceiving an instructor as a passive leader may emerge *not* because of his/her actual leadership behaviour but rather because of the students' unmet expectations.

Attributed leadership style and tangible and intangible outcomes

Examining the relationship between the three leadership styles and outcomes revealed that leadership style was mainly correlated with student satisfaction. The more the students attributed transformational leadership style to the instructor and the less they attributed to him/her a passive leadership style, the more satisfied they were. This pattern of correlations replicated for satisfaction from both task and social aspects of the course. In contrast, the attributed leadership style did not seem to be related to the actual behaviour of the students (that is, student participation in a discussion group) nor to their academic achievements.

These findings should not, however, demean the importance of perceived leadership style. Actual achievements in an academic setting are primarily affected by the academic ability of the students and the level of difficulty of the course. Furthermore, discussion groups are not the primary way of learning. A variety of other instructional channels and strategies may contribute to student achievements, leaving the instructor's leadership style as a minor factor. Activity level

in a discussion group is largely predicted by instructional design (Lowry et al., 2006) and by individual differences (Caspi et al., 2006, 2008; Chen and Caropreso, 2004; Rienties et al., 2009). In previous studies, Mazzolini and Maddison (2003, 2007) found that frequent posting by instructors did not result in greater student participation in educational discussion groups. However, instructors who posted frequently were perceived by their students to be more enthusiastic and expert than those who did not. In other words, instructors' behaviour did not affect student participation whereas it did influence the instructors' attributed trait. Thus, it is not surprising that participation and course grades were not related to the perceived leadership style.

These findings may have implications for other settings as well. Leaders cannot always improve the tangible benefits they provide to their subordinates. Findings of the present research suggest that the satisfaction of the subordinates might be tied more strongly to their perception of the leader rather than to the actual tangible benefits the leader can provide.

Leader assistance

Students reported receiving relatively high levels of assistance from the instructors. Hence, the virtual teaching environment did not prevent the students from perceiving the instructors as useful and helpful. As expected, the more the students reported they received assistance from the instructor, the higher their satisfaction was with both task and social aspects of the instructors' behaviour. The leadership style attributed to the instructor was correlated to the degree of reported assistance. As expected, the more the instructor's leadership style was perceived as transformational and the less it was conceived as passive, the more he or she was rated as providing assistance. Hence, instructors who were perceived as expressing personal consideration, instilling motivation and inspiration, and offering intellectual stimulation were conceived as providing assistance in multiple challenges involved in teaching an academic course.

The design of the research does not allow for drawing conclusions regarding the causal paths among leadership style, assistance and satisfaction. We focused on measuring subjective perceptions of leadership style, assistance, and satisfaction, and all the measures were provided by the same source: the students. Multiple complementary causal processes can be proposed: first, one of the possible embodiments of leadership style is the actual assistance provided to the students. According to this path, transformational leaders help students more, and thus contribute directly to their satisfaction. Second, the extent of assistance affects both satisfaction and the leadership style attributed to the instructor. This causal path, if valid, has more direct practical implications, because although changing leadership style is possible (Barling et al., 1996; Kelloway et al., 2000), it is much more feasible to change the extent and the quality of assistance provided. Finally, it is possible that the students created an image of the leader based on other factors, and this image affected both perceived assistance and satisfaction. The latter causal path is theoretically intriguing, and we discuss it in greater detail below.

Images of virtual leadership

Computer-mediated communication has been widely used in different contexts, and it was shown that users may generate an image of the communicator that is close to the communicator's self-perception (Buffardi and Campbell, 2008; Marcus et al., 2006; Vazire and Gosling, 2004). Extensive studies show that people form definite images of others based on minimal information (Carney et al., 2007). People feel capable of describing the personality of others based on minimal exposure

to their behaviour, even when the behaviour is clearly non-spontaneous (for example, reading a weather report) or the exposure is very short (Ambady and Rosenthal, 1992, 1993; Borkenau et al., 2004). The present study contributes to this line of research by showing that people form an image of leadership merely by observing the instructor's behaviour in an online textual environment. The level of participation of the students in the discussion groups was rather low and most students were merely passive observers of the interaction between the instructor and the few active students. Thus, following previous studies that tested the accuracy of first impression based on minimal information, people show that they form an image of the leader even in the absence of actual interaction.

In the present study, this was evident in the students' filling out of the MLQ items regarding their instructor's leading behaviour in the discussion groups, and in the validation of the scale's structure. Furthermore, the data analysis revealed that the leadership style attributed to the instructor was related to satisfaction above and beyond the role of the leader in providing assistance. This suggests that students formed a mental image of the leadership style that was partially independent from their direct experience with the instructor's behaviour.

This study is not without limitations. First, we found a low internal consistency of the active management-by-exception factor. Therefore, it is possible that some null correlations are due to the instability of the measurement and not the result of any absence of existent relations between this leadership style and other variables. We conceive the results regarding the active management-by-exception style as apparently less satisfying, but our data leave this unconfirmed hypothesis to future research. Second, we do not have information regarding the relationship between leadership style recognized in a face-to-face environment and leadership style identified in a virtual environment. Alignment between leadership behaviours in the two environments suggests that leadership style is an inherent characteristic of the leader, while cross-situational *inconsistency* supposes that environmental factors might largely influence followers' perception. Although we did not intend to compare leadership behaviour in the two environments, it seems an important theoretical as well as practical question to be answered in future research. Third, our analysis relied on a single administration self-report survey. Podsakoff et al. (2003: 885) argued that 'method biases are likely to be particularly powerful in studies in which the data for both the predictor and criterion variable are obtained from the same person in the same measurement context using the same item context and similar item characteristics'. However, both the perception of leadership style and students' satisfaction are in the eyes of the same beholders, thus, it might be difficult to obtain independent sources for both the predictor and the criterion. Last, our data do not afford dissociation between the influence of the virtual environment on the one hand, and the impact of the educational setting, on the other hand. To that end, the generalizability of the results is yet to be tested.

Despite these limitations, this study provides contributions to scholars studying organizational behaviour as the findings are innovative in two ways: they provide empirical evidence that leadership theories developed in the context of face-to-face interaction are valid in the context of distant interaction through a web-based environment. They further show that the FRLT is applied to the asynchronous, web-based, instructional environment which is being increasingly adopted in higher education institutions around the globe (Renes and Strange, 2011).

Note

1. Another concern is the difference between the students who had met the instructor and the students who had not. A series of comparisons of these correlations, using *r*-to-*z* transformation (Cohen and Cohen,

1983) revealed non-significant differences for most pairs. However, it is noted that the correlations found for the students who had not met the instructor were systematically higher than those found for the other students.

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