Longitudinal Study of Leadership in the Virtual Team Environment

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Abstract

A recent PsycINFO search revealed a 200% increase in exploratory research for transformational leadership and team effectiveness in virtual teams just in the last decade. Clearly, the emergent field of leadership in alternative work settings is gaining momentum as organizations begin to capitalize on the human resource potential in virtual and global settings. Development of leadership and management skills for virtual environments is essential in maintaining an organizational competitive advantage in today's global, dynamic market. As models of leadership are refined and opportunities for alternative experimental testing environments are discovered, research in leadership and team work can also reach greater diversity and simulation standards.

This research aims to evaluate dynamic team processes and the effect of leadership style and leader acceptance on overall team effectiveness using an online team-based simulation environment. Using online metrics and survey questionnaires to assess leadership and team characteristics, significant relationships between the factors of (a) leadership style, (b) leader acceptance, and (c) team processes are expected to have significant influence on overall team effectiveness. This study aims to further our understanding and development of best practices in managing and leading the virtual team.

Keywords: virtual teams, leadership styles, leader acceptance, team processes and development

Purpose

The purpose of this proposed study is to better understand the dynamic nature of virtual team processes, especially in how leadership emergence, leadership style, and leader acceptance interrelate with team developmental processes to strengthen or reduce overall team effectiveness and productivity.

An overall evaluation of current trends in leadership research has pointed towards taking a more holistic view of leadership including the dynamic interaction between leader models, followers, team processes, task/situational context, and leadership levels (Avolio, Walumbwa & Weber, 2009). Mixed-method designs were promoted as opportunities to better understand leadership and team processes by using integrated qualitative/quantitative approaches to research design. Similar reviews of the most recent empirical research on the organizational impact of leadership have recommended areas of further examination to include longitudinal models and leadership effects on emergent team and unit-level processes (DeChurch, Hiller, Murase, Doty, & Salas, 2010).

The Global-Virtual Team in Today's Organizations

A main benefit to organizations to use virtual teams is in its access to a more varied, diverse, and skilled labor pool. A project team which is facilitated virtually can recruit members having crucial skills and/or information without regard to location restrictions (Levi, 2007). Malhotra, Majchrzak, and Rosen (2007) emphasized "that leading a virtual team requires all the leadership and project management skills needed for a collocated team and *more*" (p. 68, original emphasis). However, globally located virtual teams have a plethora of barriers to overcome including cultural values, diversity acceptance, time zone differences, mutual trust, cohesion, and communication issues (Levi, 2007; Maznevski & Chudoba, 2000).

Using the virtual team typology from Bell and Kozlowski (2002), the complexity of team task will be considered a moderating factor as it affects the virtual team dimensions of (a) temporal distribution, (b) boundary spanning, (c) lifecycle, and (d) team member roles. According to the researchers, this emergent form of teamwork is expected to gain momentum in response to the dynamic, complex, and global needs of today's organizations.

Leadership in Teams

Teamwork processes and leadership perspectives are complex constructs that need further research to better understand (Avolio et al., 2009; Kozlowski & Bell, 2003; DeChurch et al., 2010; Levi, 2007). This study proposes an examination of leader emergence, leadership style, and leader acceptance factors within the dynamic, developmental processes of a virtual team.

Leadership styles consistent with shared or distributed leadership are focused upon in this study, including transformational, authentic, and functional leadership models. These leadership styles are expected to have an interrelational effect with teamwork processes. Exploring which leadership styles have stronger relationships with team climate measures in the dynamic, virtual team environment will add to current research on the complexities of leadership in teams. (Day, Gronn, & Salas, 2004; Kozlowski & Bell, 2003; Morgeson, DeRue, & Karam, 2010; Small & Rentsch, 2010).

Also directly related to leadership style is the notion of acceptance of the leader. The Leader Prototype Theory (Ritter & Lord, 2007) which states that group members rely on their implicit notions of what a good leader is like to determine their acceptance of the leader, and which subsequently determines how much power and influence the members will allow from the leader, has significant ramifications on how well a leader will perform overall. Especially in self-managing teams, a leader who provides direction and structure, operates according to a delegation of tasks, uses democratic decision making, and encourages team members' development in skills and abilities, will typically produce a team with improved quality, performance, and team member morale (Levi, 2007).

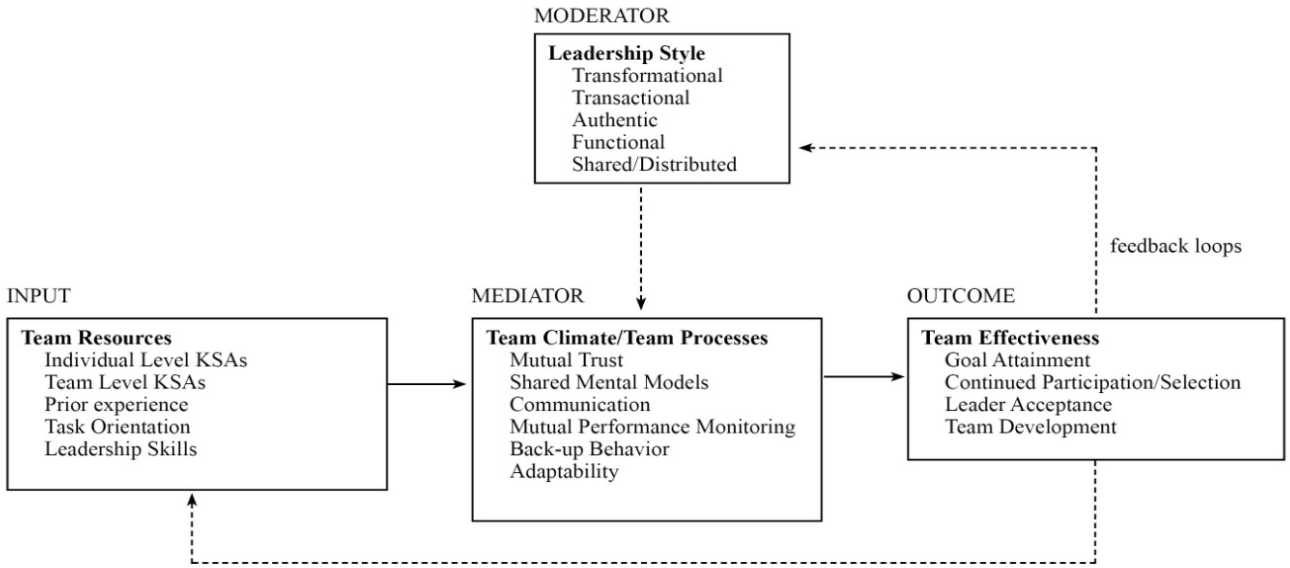
Team Level Processes

As introduced in the review conducted by Day et al. (2004), this study uses the Inputs, Mediator, Outputs, Inputs model (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). This model recognizes the mediation influences in team processes, and also addresses the important concept of feedback loops which are essential in understanding team development over time.

As team performance cycles progress through successive transition and action phases, development in effective team attributes is expected. Indicators of positive team development include the five critical components posited in research completed by Salas, Sims, and Burke (2005) including mutual performance monitoring, back-up behaviors, adaptability, active leadership, and team orientation. Using these models of team processes and developmental

attributes, a mediated relationship is expected between team climate factors and overall team effectiveness. Also a cyclical causal feedback loop is expected to interrelate with leadership style and ongoing team effectiveness (Day et al., 2004) as illustrated in Figure 1.

Figure 1: Relationship between Team Resources and Team Effectiveness



Legend: Figure 1 illustrates how leadership style moderates team climate, which in turn explains the variability in team effectiveness. The input mediation output input (feedback loops) are adapted from framework proposed by Ilgen (as cited by Day et al., 2004). Knowledge, Skills, and Abilities (KSAs)

Hypothesis 1: Over time, self managed teams that are allowed to self select will create an input mediator output input loop that increases in shared leadership, positive team climate and increased team effectiveness.

Hypothesis 2: Teams that are moderated by transactional or heavily hierarchical leadership styles will result in less continuance (higher turnover) and lower productivity.

Given an opportunity to observe and assess team processes and leadership development, this proposal hypothesizes that significant correlations will exist between leadership styles and overall team performance and group acceptance of the team leader in a virtual team environment. This proposed study builds upon the previously established leadership frameworks as it seeks to confirm or disconfirm the relationship between leadership styles and overall team effectiveness, including possible mediating factors of leader acceptance and team processes that influence the feedback loop inputs. Advancement of leadership science requires future research in the complex world of leadership and team dynamics in the virtual environment.

Method

By recruiting through an established online beta gaming environment, this study aims to provide an opportunity to observe leadership traits in a mixed leadership simulation including

traditional-hierarchical and collective-shared leadership processes practiced in today's organizations. And finally, the longitudinal nature of this study aims to address several recommendations for future research and provide a platform for understanding team and leadership development over a time period.

Participants

The targeted sample group to be recruited via an online gaming application involves each participant character in military combat to gain and maintain occupation of various base facilities. Age of participants is expected to range between 18 to 70 years old as according to data collected by the Entertainment Software Association (2011), the age of the average gamer is 37 years old with 42 percent female players as the industry's fastest growing demographic segment and 29 percent of players aged over 50 years old. Participants in this type of gaming environment come from a diverse segment of the population which is representative of the work labor pool.

Measures

The following survey instruments have been validated and are currently accepted as reliable instruments in psychological research studies. International Personality Item Pool (IPIP-NEO) (Goldberg, 1999); Wechsler Adult Intelligence Scale—Fourth Edition (WAIS–IV) (Wechsler, 2008a); Authentic Leadership Questionnaire (ALQ) (Walumbwa, Avolio, Gardner, Wernsing & Peterson, 2008); Team Climate Inventory (TCI) (Anderson, & West, 1998); Multifactor Leadership Questionnaire (MLQ) and Team Multifactor Leadership Questionnaire (TMLQ) (Avolio & Bass, 1998).

Procedures

As a function of the game, character participants choose their field of expertise, seek certifications to further their own skills and resource capacity in their specialization, and make autonomous decisions regarding what goals to pursue, what squadrons to join, and how they will interact with other character players. While findings correlating real world behavior to virtual behavior have been mixed (McCreery, 2012), this study posits that team goal orientation within the virtual game environment will parallel team behaviors in the virtual workplace. With company approval to work within their beta testing environment, an informed consent and initial surveys would be offered upon receipt of a potential character participant's request for an authorization code. Data from these initial surveys, IPIP-NEO and WAIS-IV, will be collected to create a baseline of personality and cognitive ability. Demographic data including race, gender, age, ethnicity, and education completed will also be gathered at time of entry (t_0).

The MLQ will be completed by participants that choose to become leaders. Team achievement is required for promotion of the leader's Command Rank. At these milestones of level advancement for the squadron leader, he/she will receive a prompt to complete either the MLQ or ALQ as a follow up survey. Additionally, any team members with significant time with the squad leader will also be prompted to complete either the TCI or TMLQ. All surveys will be administered online. Team and leader metrics will be gathered from the parent company system including: (a) time elapsed between a participant's enrollment and when he/she elects to become a squadron leader, (b) percentage of time a team member participates in a particular squad leader's team , and (c) team performance measures of task completion as indicated by the

squadron leader's Command Rank (CR). Compensation in the form of special tools, equipment, or unique items will be gained by character participants at survey completion.

To study the relationship between leadership styles and leader acceptance, participants will complete surveys at milestone points in the team's development. This will be an exploratory and longitudinal design in that changes in the leadership style of the leader will be evaluated in relation to (a) the team members' perception of the leader, and (b) the overall effectiveness of the team, to determine what significant correlations are found over the time of team building and performance outcomes. Data obtained from online surveys will be evaluated using multiple regression for leader emergence to identify which input variables exhibited significance. A multi-factor analysis of variance (MANOVA) will be used to evaluate the covariance between the input variables of both the leader and the team members.

Time points for further data collection of leadership style and follower acceptance are determined by the participant's choice to become a leader and subsequent achievements: Time 0 (t_0) will occur when a participant accepts the Informed Consent and enters the Beta online gaming environment. At this point, the IPIP-NEO and WAIS–IV Questionnaires will be completed, and also a demographic questionnaire. Time 1 (t_1) will occur when a participant indicates his/her desire to become a 'squadron leader'. At this point, the leader-participant will be sent a survey link to the MLQ. Subsequent time points (t_2, t_3, t_4, t_5, t_6) will occur as the leader achieves command ranks as a function of when team goals are completed. Command Rank (CR) can be obtained in 5 levels: CR1 thru CR5. At each CR level achieved, a survey link will be sent to the leader to complete either the MLQ or ALQ. Also, a separate survey link for either the TMLQ or TCI will be sent to team members who have joined with that leader more than 50% of the team's activity time since the previous CR promotion. Survey collection time points are summarized in Table1 below.

Table 1
Survey Data Collection Time Points

Time Point	Participant	
	Leader	Team Member
Entry (t_0)	IPIP-NEO WAIS-IV	IPIP-NEO WAIS-IV
Leader Emergence (t_1)	MLQ	
CR1(t_2)	ALQ	TMLQ
CR2(t_3)	MLQ	TCI
CR3(t_4)	ALQ	TMLQ
CR4(t_5)	MLQ	TCI
CR5(t_6)	ALQ	TMLQ

Legend: t_0 = participant accepts Informed Consent and enters the Beta online gaming environment.
t_1 = participant indicates his/her desire to become a 'squadron leader'.
t_2, t_3, t_4, t_5, t_6 = participant acting as squadron leader achieves command ranks as team goals are completed.
Command Rank (CR) can be obtained in 5 levels: CR1 thru CR5.

Conclusion

In investigating the factors affecting the internal processes of leadership and team climate, this research expects to find significant relationships between the measures of leadership styles and the team's overall effectiveness. This study also hopes to better define applied leadership theories for use in continued evaluation of dynamic internal team processes (communication, trust development) and the effect of contextual and situational factors (ie. unexpected obstacles, organizational constraints) in the virtual environment.

Future Implications for Organizations

This proposed study builds upon the previously established leadership frameworks as it seeks to evaluate the relationship between leadership styles and overall team effectiveness, including possible mediating factors of leader acceptance and team processes that influence the feedback loop inputs. This study aims to further our understanding and development of best practices in managing and leading the virtual team, enabling better decisions in recruitment and selection for virtual teams (Humphrey, Hollenbeck, Meyer, & Ilgen, 2011; Turel, & Zhang, 2010), empirically based team development and team training methods (Day et al., 2004; Maznevski et al., 2000), and providing organizations with guidance in management decision making (Bergman, Rentsch, Small, Davenport & Bergman, 2012) in the dynamic context of the global, virtual team.

This study opens the door to future research opportunities using alternative virtual work simulations (Boies, Lvina, & Martens, 2010) and further examination of team behavioral constructs like team efficacy, team-level organizational citizenship behaviors, and team-level motivation. Today's organizations, operating in the complex, ever-changing global market, need the tools and understanding to better manage and lead the virtual team - across cultures, time zones, spatial and communication challenges, and member role differentiations.

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