2002

Dispersed Leadership Predictor Of Knowledge Acquisition

Politis, John D.

IEDC, International Economic Development Council

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John D. Politis
Higher Colleges of Technology, Dubai, United Arab Emirates
John.Politis@hct.ac.ae

Abstract

Behavioural and interpersonal skills most often cited as essential for successful knowledge acquisition. Little is known, however, about the roles played by 'dispersed leadership' in the process of knowledge acquisition. A survey of 227 self-managing employees who are, or have been engaged in knowledge acquisition activities was carried out to investigate the relationship between the specific 'dispersed leadership' dimensions and a number of knowledge acquisition attributes. Results indicated that some, but not all; 'dispersed leadership' dimensions are positively related to the skills and traits that are essential for knowledge acquisition.

Keywords: Knowledge Acquisition, Dispersed Leadership, Self-management, Superleadership.

1. Introduction

One of the most notable trends of the 1990s was the explosion of teamwork in manufacturing and service organizations. As teamwork grows in popularity (Cohen et al. 1996; Donovan, 1998), leadership is increasingly taking place within a team context. In this new work order the role of leader is different from the traditional leadership role performed by first-line supervisors. The challenge for most leaders is to develop capacity in others (Kouzes & Posner, 1993) by creating a climate in which acquiring and sharing knowledge is encouraged, or even demanded. Current research lacks the empirical evidence to make a strong suggestion regarding which leadership style best supports and facilitates knowledge acquisition.

Recent research (Politis, 1999) suggests that the leadership styles that are characterized by participative behaviour and mutual trust and respect for subordinates' ideas and feelings are positively related to some, but not all, dimensions of knowledge acquisition attributes. This paper was written mainly to identify those specific 'dispersed leadership' dimensions that predict knowledge acquisition. The present study was a questionnaire-based survey using members of self-managing teams in a manufacturing organization. The analyses conducted produced positive relations between some of the 'dispersed leadership' dimensions and knowledge acquisition attributes. These findings may be of assistance to executive trainers and recruiters. It may be possible to "diagnose" a potential leader and help him or her to develop 'dispersed leadership' behaviour that may be most helpful to self-managing teams to acquire knowledge for carrying out their particular task.

2. Determinants of Knowledge Acquisition Attributes

Knowledge acquisition is defined as "acquiring information directly from domain experts" (Mykytyn, et al. 1994: 98). A review of the literature revealed that the background, skills, training and traits of knowledge workers (KWs) are most often

essential for successful knowledge acquisition (McGraw & Harbison-Briggs, 1989; McGraw & Seale, 1987; Mykytyn, et al. 1994; Rolandi, 1986). Mykytyn, et al. (1994) revealed 26 behavioural skills and traits (attributes) that are essential for knowledge acquisition. These attributes produced five factors namely communication/problem understanding; personal traits; control; organisation and negotiation. But these factors do not emerge spontaneously or in a vacuum. They evolve out of the context and the history of the organisation and their impact is conditioned by the subjective perceptions of knowledge workers (KWs) whose experience is ruled by that history.

This draws attention, among other things (i.e., organisational process and mechanisms), to the roles played by leadership in developing and linking these factors for successful knowledge acquisition. It is being argued that the guiding role of management for any knowledge management strategy is crucial (Pan & Scarbrough, 1998). Having outlined the attributes of knowledge acquisition, it is important to recount the way in which these attributes developed, and in particular, within the teamwork environment.

There must be a dynamic interaction between leadership and KWs in a way of encouraging and energising the perceptions and attitudes of employees for knowledge acquisition. Leadership is defined broadly as influence processes affecting the actions of followers (KWs), the choice of objectives for the group or organisation (Yukl, 1981). Various theories of leadership have emerged over the past hundred years, such as the Trait Theory, Behaviour Theory, Situational Theories and Self-leadership Theory. Other approaches for effective leadership (Transformational, Transactional, Empowerment, etc) have been also reported in the literature. While the growing popularity of a quantitative research approach within the New Leadership tradition continues, at approximately the same time as the Transformational and Transactional theory, a separate leadership approach which focuses on 'dispersed leadership' emerged.

3. Dispersed Leadership

Dispersed leadership can be illustrated in four sets of writings. The first writing of an emergent dispersed leadership is in Katzenbach and Smith's (1993) book in which they discuss the virtues of 'real teams', that is teams with "a small number of people with complementary skills who are committed to a common performance purpose, performance goals, and approach for which they hold themselves mutually accountable" (p. 45). Katzenbach and Smith view the role of the leader of such teams in terms of developing leadership in others by building commitment and confidence, removing obstacles, creating opportunities and being part of the team. Second, Kouzes and Posner (1993) argued that credible leaders develop capacity in others. They "turn their constituents into leaders (p. 156). Kouzes and Posner view the role of the leader in terms of helping and facilitating followers to use their abilities to lead themselves and others, a view which was supported recently by Jassawalla and Sashittal (2000). The third expression of the dispersed leadership can be seen in the suggestion paid to leadership processes and skills, which may or may not reside in formally designated leaders. Hosking (1991) view leadership in terms of 'organizing' activity. In particular, she identifies networking as an important skill among leaders, in which the cultivation and exercise of wider social influence is the key ingredient. Finally, Manz and Sims

(1987, 1989, 1993) have developed an approach which specifies the advantage of a type of leadership that is expected to supersede the 'visionary hero' image which is a feature of the perception of leaders in the New Leadership tradition. Manz and Sims introduced a style of leadership known as "Superleadership", so followers are stimulated to become leaders themselves, a theme that was in fact a feature of Burns's (1978) perspective on transforming leadership. In the context of Superleadership, the leader is a facilitator who cultivates and motivates followers. Such leadership style is known as self-management leadership (Manz & Sims, 1989).

As shown in the four sets of writing, dispersed leadership views leadership activities, which are not necessary lodged in formally designated leaders, especially the heroic leader who is a feature of much New Leadership writing. In dispersed leadership, team leaders are facilitators, not heroes, and they "take inordinate steps to scout for the right mix of talents and coach each team member, ..., they encourage team members to improve their inherent, and necessarily distinctive, talents" (Jassawalla & Sashittal, 2000: 39). For the purposes of this paper, the dimensions of the fourth writing of dispersed leadership that are related to self-managing environments were employed to predict the attributes of knowledge acquisition.

3.1 Self-management leadership dimensions

Self-management leadership dimensions were derived from Manz and Sims' (1986, 1987) theory and research. The purpose of Manz and Sims' (1987) research work was to find the independent dimensions of leader behaviour that are appropriate for the success of self-managing teams. Manz and Sims (1987) developed the Self-Management Leadership Questionnaire (SMLQ) as a measure of such leader dimensions. The six dimensions tapped by the SMLQ are:

- *Encourage self-observation* so that the members of a team can gather the information and the knowledge required in monitoring their performance.
- *Encourage self-goal setting* so that the members of a team set performance goals.
- *Encourage self-reinforcement* so that the members of a team recognise and reinforce their performance.
- *Encourage self-criticism* so that the members of a team are self-critical and discourage poor performance.
- *Encourage self-expectation* so that the members of a team have high expectations for performance.
- *Encourage rehearsal* so that the members of the team practice a task before performing it.

Findings suggest that self-management leadership behaviour (Cohen, et al. 1996) assist employees to develop their own performance standards and acquire knowledge and the information required to managing themselves. Previous studies have assessed the impact of the aggregate self-management leadership behaviours (second order factor) on the behavioural skills and traits that are essential for knowledge acquisition (Politis, 1999). The affect, however, of each of the six dimensions tapped by the SMLQ on the

attributes of knowledge acquisition has not been empirically tested. In this paper we hypothesised that each of the six self-management leadership behaviour dimensions will predict the attributes of knowledge acquisition. This functional relationship is shown in the schematic diagram below (Figure 1).

Hypothesis 1: Encourage Self-Observation will be positively related with knowledge acquisition attributes (behavioural skills and traits) of KWs.

Hypothesis 2: Encourage Self-Goal Setting will be positively related with knowledge acquisition attributes (behavioural skills and traits) of KWs.

Hypothesis 3: Encourage Self-Reinforcement will be positively related with knowledge acquisition attributes (behavioural skills and traits) of KWs.

Hypothesis 4: Encourage Self-Criticism will be positively related with knowledge acquisition attributes (behavioural skills and traits) of KWs.

Hypothesis 5: Encourage Self-Expectation will be positively related with knowledge acquisition attributes (behavioural skills and traits) of KWs.

Hypothesis 6: Encourage Rehearsal will be positively related with knowledge acquisition attributes (behavioural skills and traits) of KWs.

Dispersed Leadership Attributes　　　　　　　　　　　**Knowledge Acquisition**

Self-Management Leadership Behaviour (Manz and Sims, 1987)

- Encourage Self-Observation
- Encourage Self-Goal Setting
- Encourage Self-Reinforcement
- Encourage Self-Criticism
- Encourage Self-Expectation
- Encourage Rehearsal

Behavioural Skills and Traits for Knowledge Acquisition **(Mykytyn, et al. 1994)**

- Communication/ Problem Understanding
- Personal Traits
- Control
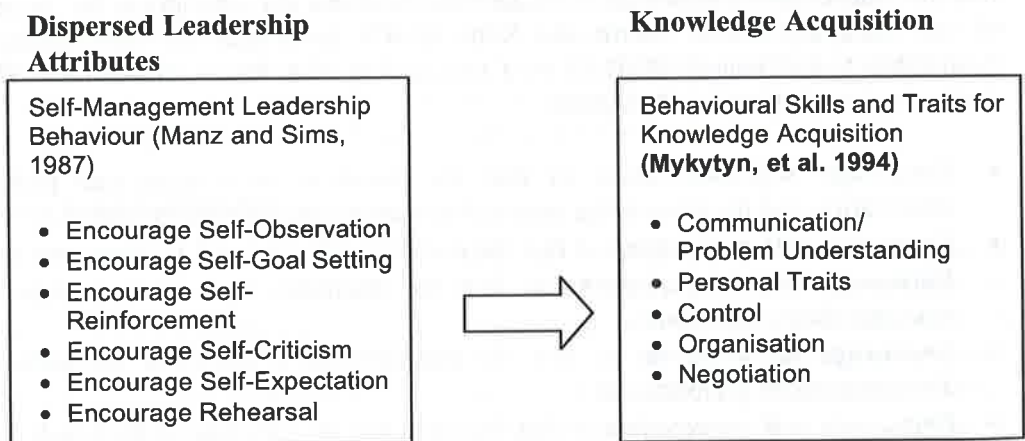- Organisation
- Negotiation

Figure 1. Summary of Variables Used in the Paper

4. Subjects and Procedure

4.1 Sample

The sample was drawn from a large-sized high technology manufacturing organisation (aerospace) operating in Sydney, Australia. The sample consisted of members of self-managing teams closely linked to manufacturing operations and included design engineers, manufacturing engineers, industrial engineers, production planners, production controllers, clerical staff, and first line supervisors. Respondents were

engaged in the design and manufacturing of aerospace products that require high level of knowledge acquisition skills.

All respondents were full-time unionized employees and volunteered to participate in the study. Questionnaires containing items measuring the above six self-management leadership style dimensions and knowledge acquisition attributes were distributed to 280 self-managing employees. A total of 227 employees (81 per cent response rate) returned usable questionnaires. Eleven employees were excluded from the final sample since their questionnaires were incomplete.

Employees were 7.9% female and 92.1% male. In terms of the level of education, approximately a $^1/_4$ of the sample had attained a university degree or postgraduate studies and almost $^1/_2$ has received technical college qualifications or equivalent technical training.

4.2 Analytical Procedure

The Analysis of Moment Structures (AMOS) was used for the factor analysis (measurement model) and for the regression analysis (path model). Following the recommendations of Holmes-Smith (1998) and Sommer, et al. (1995), we first developed the measurement model and then, with this held fix, a path model is developed. Using confirmatory factor analysis (CFA) we first assess the validity of the measurement model of the variables used in the paper. Given adequate validity of those measures, we reduced the number of indicators in the model by creating a composite scale for each latent variable. A mixture of fit-indices was employed to assess the overall fit of the measurement and path models. The ratio of Chi-square to degrees of freedom (χ^2/df) has been computed, with ratios of less than 2.0 indicating a good fit. However, since absolute indices can be adversely affected by sample size (Loehlin, 1992), three other relative indices (AGFI, TLI, and PGFI) were computed to provide a more robust evaluation of model fit (Tanaka, 1987; Tucker – Lewis, 1973). For the AGFI, TLI, and PGFI, coefficients closer to unity indicate a good fit, with acceptable levels of fit being above 0.90 (Marsh, Balla and McDonald, 1988). The analytical procedure (steps) to calculate the regression coefficient λ and measurement error θ of each variable used in this paper are detailed in Politis's (1999) study. The parameters of λ and θ were used as fix parameters in the path model.

5.   Measurement Models

As shown in Figure 1, the variables that we measure on the survey are: Encourage Self-Observation, Encourage Self-Goal Setting, Encourage Self-Reinforcement, Encourage Self-Criticism, Encourage Self-Expectation, and Encourage Rehearsal (as rated by team members) and employees (KWs) behavioural traits and skills that are essential for knowledge acquisition.

5.1 Independent Variables

Self-management leadership measures were assessed using Manz and Sims' (1987) 22 item Self-Management Leadership Questionnaire (SMLQ). The theory posits six

dimensions of self-leadership behaviour (Encourage Self-Observation, Encourage Self-Goal Setting, Encourage Self-Reinforcement, Encourage Self-Criticism, Encourage Self-Expectation, and Encourage Rehearsal). Based on the results of a CFA supporting five factors, these items were used to create five scales: Encouraging Self-Rehearsal (five items, $\alpha = .87$), Encouraging Self-Goal Setting (three items, $\alpha = .88$), Encouraging Self-Observation (three items, $\alpha = .84$), Encouraging Self-Expectation (three items, $\alpha = .81$), and Encouraging Self-Criticism (four items, $\alpha = .87$). Four items were dropped due to cross loading.

5.2 Dependent Variables

Knowledge acquisition attributes (behavioural skills and traits) made up of the subcategories of communication/problem understanding, personal traits, control, organization, negotiation, and liberal arts/nonverbal communication. These categories were assessed using the Mykytyn, et al's. (1994) 26 item instrument. Based on the results of the CFA five factors were supported: communication/problem understanding (seven items, $\alpha = .87$), personal traits (three items, $\alpha = .75$), control (four items, $\alpha = .85$), organization (five item, $\alpha = .86$), and negotiation (three items, $\alpha = .90$). Factor six (liberal arts/nonverbal communication) was dropped due to poor loadings. Four items were dropped due to cross loading.

6. Path Modeling

Using the analytical procedure outlined in Politis's (1999: 453-454) study, the computation of the parameters λ and θ was performed. These parameters will be used in the path model. Table 1 contains the mean, standard deviations, reliability estimates, and the regression coefficient λ and measurement error θ estimates.

Table 1. Descriptive Statistics, Reliabilities, λ and θ Estimates

Variable	Mean	SD (σ)	Reliability Estimate (r_c)	Loading $\lambda = \sigma * \sqrt{r_c}$	Error Variance $\theta = \sigma^2 * 1 - r_c$
Dispersed Leadership Encourage:					
Self-Observation	4.92	1.40	.85	1.29	.293
Self-Goal Setting	4.70	1.53	.89	1.44	.269
Self-Criticism	4.44	1.48	.89	1.40	.251
Self-Expectation	4.90	1.41	.92	1.35	.167
Rehearsal	4.34	1.59	.89	1.49	.285
Knowledge Acquisition Attributes					
Problem understanding	4.00	.98	.87	.92	.126
Personal traits	4.53	1.19	.75	1.03	.356
Control	4.14	1.12	.85	1.04	.190
Organisation	4.37	1.16	.86	1.07	.189
Negotiation	4.59	1.30	.90	1.23	.169

Note: r_c is the composite reliability estimate and is usually > Cronbach alpha (α)

Once these parameters (regression coefficients *(λs)* which reflect the regression of each composite variable on its latent variable, and the measurement error variances *(θs)* associated with each composite variable) are calculated, we build this information into the path model to examine the relationships among the latent variables.
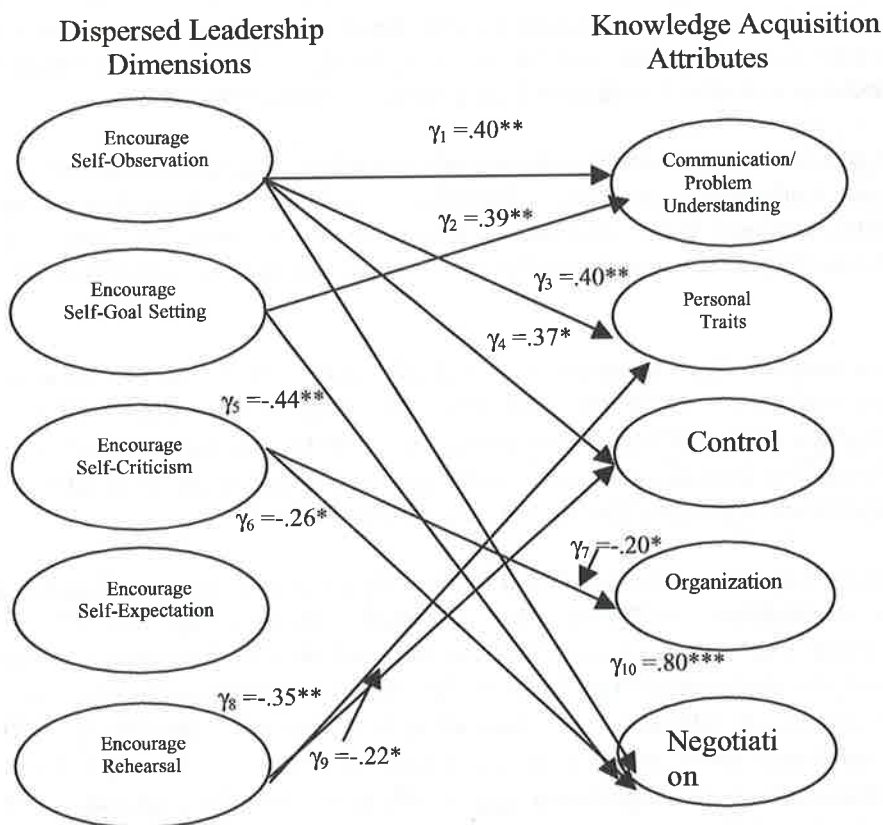
The model of Figure 2 contains five dispersed leadership style dimensions namely self-management leadership, and five dependent variables (communication/problem understanding, personal traits, control, organization, and negotiation). One of the six dispersed leadership dimensions (Self-Reinforcement) was not supported from the CFA results.

The analysis revealed that the structural model of Figure 2 fit the data fairly well, with $\chi^2 = 19.3$; df =18; GFI = .98; AGFI = .95; TLI = .99; RMR = .049; and RMSEA = .018. Figure 2 displays results of hypotheses testing using SEM. Standardised path estimates (γs) are provided to facilitate comparison of regression coefficients. It should be noted that only significant regression coefficients are shown.

Two out of six hypotheses are supported by this data, for at least some dimensions of knowledge acquisition attributes. As predicted, Encouraging Self-Observation leadership behaviour had positive effect on four out of five knowledge acquisition attributes, largely supporting **Hypothesis 1**: Specifically, Encouraging Self-observation behaviour is positively related to Communication/Problem Understanding ($\gamma_1 = .40$, p < .01), Personal Traits ($\gamma_3 = .40$, p < .01), and Control ($\gamma_4 = .37$, p < .05). It had also strong, positive effect on Negotiation ($\gamma_{10} = .80$, p < .001). Encouraging Self-Goal Setting leadership behaviour is positively related with only one out of the five knowledge acquisition attributes, providing limited support for **Hypothesis 2**: Specifically, Encouraging Self-Goal Setting leadership behaviour had positive effect on Communication/Problem Understanding ($\gamma_2 = .39$, p < .01), while the results showed negative effect on Negotiation ($\gamma_5 = -.44$, p < .01).

In addition, two out of six hypotheses are not supported by this data. Specifically, Encouraging Self-Criticism leadership behaviour is negatively related to Negotiation ($\gamma_6 = -.26$, p < .05), and Organisation ($\gamma_7 = -.20$, p < .05), which is in the opposite direction predicted by **Hypothesis 4**. Similarly, Encouraging Rehearsal had negative effect on Personal Traits ($\gamma_8 = -.35$, p < .01), and Control ($\gamma_9 = -.22$, p < .01), not supporting **Hypothesis 6**. Finally, Encouraging Self-Expectation leadership behaviour had no significant paths with any of the five knowledge acquisition attributes not supporting **Hypothesis 5**. We were not able to test **Hypothesis 3** because the indicator variables of Self-Reinforcement based on the results of CFA did not form a single factor. No other paths are significant.

Dispersed Leadership
Dimensions

Knowledge Acquisition
Attributes

$\gamma_1 = .40^{**}$

$\gamma_2 = .39^{**}$

$\gamma_3 = .40^{**}$

$\gamma_4 = .37^*$

$\gamma_5 = -.44^{**}$

$\gamma_6 = -.26^*$

$\gamma_7 = -.20^*$

$\gamma_{10} = .80^{***}$

$\gamma_8 = -.35^{**}$

$\gamma_9 = -.22^*$

*p < .05, ** p < .01, *** P < .001

All correlations of predictor variables were statistical significant @ .001 level

Figure 2. Results of hypotheses testing using SEM. Standardised path estimates

7. Discussion

The overall pattern of relationships between independent and dependent variables in the structural equation model is not consistent with our hypotheses. Only some of the paths tested were confirmed. Ten of 25 tested paths between independent and dependent variables were significant. Out of the ten significant paths, five were found positive while the other five were negative. For the Encourage Self-observation leadership variable four of five paths were significant and positive. Specifically, the relationship between Encouraging Self-observation and Negotiation is the strongest reported in this paper. For the Encourage Self-Goal Setting leadership variable, one of five paths was positive, while the other paths were either negative or not significant.

Contrary to our predictions, Encouraging Self-Criticism, Encouraging Self-Expectations and Encouraging Rehearsal resulted in either nonsignificant or a negative, not positive, effect on knowledge acquisition attributes.

In general, the findings of this research support the notion that the leaders that encourage self-observation of knowledge workers (KWs) are most helpful to the members of self-managing teams to acquire knowledge for carrying out the design and manufacture of aerospace products.

Traditionally middle management has been perceived as information and knowledge gatekeepers. So management should guide the radical cultural change for knowledge-creation and knowledge sharing of all employees. It is the self-observation leadership behaviour that encourages and facilitates the attributes (behavioural skills and traits of KWs) that are essential for knowledge acquisition and knowledge sharing. It is the self-observation leadership behaviour that encourages members of self-managing teams to gather the information and the knowledge required in monitoring their performance. Dispersed leadership strategies such as encouraging self-criticism and rehearsal should be avoided because might discourage knowledge acquisition.

Leaders that exhibit self-observation behaviour are capable of supporting and facilitating employees to acquire and share knowledge; leading the enterprise's effort to exploit knowledge; sponsoring and supporting ideas for further use of knowledge strategies for knowledge acquisition. These leaders are professionals who are vested with the responsibility to discharge their knowledge in an empowered environment. Concluding, the findings of this research could assist executive trainers and recruiters to diagnose leaders that exhibit high levels of encouraging self-observation strategies.

In closing, brief mention of some limitations of this study should be made to place our results in proper perspective. Though from an analytical perspective SEM has a number of advantages in testing causal relationships, some caution should be noted. First, given the cross-sectional nature of the study, we cannot test causality directly, although the hypotheses imply causation. So experimental or longitudinal data are needed for more define results. Second, a larger sample size would have allowed simultaneous estimation of measurement and structural models instead of assessing the measurement models first and then, with them holding fix, developing the structural model. A larger sample would have allowed modelling the individual (observed) variables for each of the ten latent variables, rather than just the composite constructs. Future research should estimate models that replicate our results using larger sample size.

The cross-sectional nature of the study renders it vulnerable to problems typically associated with survey research (common method variance). So the measured relationships might not be attributable to true relationship between the constructs but it might be the result of the measurement method. To reduce the problem of the common method variance, it would have been advantageous to gather data from multiple sources (Spector, 1994).

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