



# Virtual Distance and Learning: an Application of Organizational Best Practices in Education

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## Abstract

*Technology has fueled the rapid growth of learning tools within organizations and educational environments. Advances in communication technology have reshaped the nature and frequency of day-to-day interactions amongst employees and customers as well as teachers, students and parents. Virtual Distance, a measureable phenomenon discovered by Dr. Karen Sobel-Lojeski, is a multidimensional construct that identifies and explains challenges brought on by a multitude of factors. Virtual distance is defined as the perceived distance between two or more individuals or groups, caused by the persistent and pervasive use of technology-mediated work and communications.*

*Virtual Distance, has shown high predictive power for project success and innovation. When detected, virtual distance has a significant and negative impact on organizational outcomes including learning. Levels of virtual distance increase when people rely heavily on computer mediated devices. Organizations hope to gain high levels of productivity through distance learning programs and related professional development. In this paper we surveyed 122 people representing over thirty teams two large international organizations. Results show that when Virtual Distance is high group learning significantly declines. This finding is important when applying virtual distance concepts to learning in both corporate and educational environments. The impact is almost fully mediated by trust and organizational citizenship behavior. Virtual Distance decreases trust and citizenship behavior, which in turn hampers group learning. These findings have important implications to institutional learning among virtual teams.*

*Technology is a major factor in the future of education. Increased reliance on technology-mediated devices can have negative learning consequences. As such, the incorporation of virtual distance management into educational settings is essential in order to identify, measure and manage its presence. The integration of instructional and learning technology without proper virtual distance management would be a disservice to educators, students and parents.*

*This paper investigates the impact virtual distance can have on learning environments. It explores the importance of identifying, measuring and managing virtual distance and its implications for learning. Organizational examples are presented along with educational applications. This preliminary study suggests more research is needed to understand the use of virtual teams when group and organizational learning is key to success in Web 2.0 and other online environments. The paper concludes with some suggested next steps for research and practice.*

## 1. Introduction

Virtual Distance, a multi-dimensional construct defined as a perceived or psychological distance that accumulates when individuals and team members rely heavily on electronic communications, plays a key role in learning environments. Two studies were conducted to investigate the relationship between Virtual Distance and Learning in virtual teams.

The extensive use of virtual teams has become a ubiquitous around the globe [1],[2]. However, little is known about how this increasing trend predicts learning [3]. Several problems exist in the virtual team literature. First, different streams of literature don't inform one another fully. Second, the dichotomizing virtual teams, as a group of people who are either virtual or not, does little to account for the reality of complex learning environments. Third, narrowly defined distance constructs, mainly represented as geographic or temporal separation, do not account for socio-emotional processes that may lead to a psychological distance and contribute to learning influences.

To address this gap, Lojeski and Reilly developed the Virtual Distance Model [4],[5],[6],[7]. Physical distance is only part of the story and not the most important. Operational and Affinity Distance, as defined by Lojeski & Reilly, weigh much more heavily in learning outcomes. When Virtual Distance is present and learners 'feel' psychologically separated there are significant and negative impacts on



trust, organizational citizenship behavior, and learning. As more educational settings implement technology and incorporate it into classrooms, the concept of virtual distance becomes increasingly important. Virtual schools mimic organizations and impacts on learning. Students are connected via technology, but they often 'feel' psychologically separated from others.

We surveyed 122 people on virtual teams in two large organizations. Findings show that Virtual Distance has a significant and negative impact on learning.

## **Virtual Distance**

A number of theories have been used to support virtual team research, including but not exclusive of social exchange theory [8] network and organization theory [9], social presence and media richness theory [10] contingency theory [11], and structuration theory [12]. However a parsimonious theory for predicting virtual work and learning outcomes had not been established until Lojeski and Reilly [6] discovered Virtual Distance. Virtual Distance is a multi-dimensional construct defined as a perceived or psychological distance that accumulates when individuals and team members rely heavily on electronic communications. While the notion of distance is, by definition, at the heart of virtual team research, most of the literature has focused on geographic and temporal factors.

The idea that physical distance plays a role in virtual team/learner behavior is well-established. However, research also shows that other variables contribute to a sense of socio-emotional distance. These factors include, but are not limited by, building trust and motivating one another, cultural diversity, lack of goal clarity [13] and team psychological safety [14]. Collaboration, whether it is face-to-face or computer mediated, occurs within a much broader context than simply geographic and temporal dispersion.

Virtual Distance overcomes legacy limitations by including three factors: 1) physical distance including geographic and temporal factors, 2) operational distance including day-to-day issues such as communication difficulties, and 3) affinity distance, the relationship disconnects often seen as cultural differences, a lack of shared goals and uneven levels of social capital and social networking ties among group members.

## **Learning**

Kozlowski and Ilgen [1] defined team learning as "...the acquisition of knowledge, skills, and performance capabilities of an interdependent set of individuals through interaction and experience", [15]. Members share knowledge, develop memories of repeatable and successful transactions, and continuously adapt together to shifting environments.

Given that learning is a critical success factor for many organizations, we tested some of the relationships between Virtual Distance and Learning. Since trust and OCB have a negative correlation to Virtual Distance and learning we hypothesized that Virtual Distance would have a negative impact on learning and would operate primarily through trust and OCB.

## **Trust**

Trust has received considerable attention, especially in relation to virtual teams and innovation. has found Perceptions of physical distance impact individuals' willingness to trust counterparts in computer-mediated interaction [16]. Timely and consistent communication (especially task-oriented) was likely to engender trust within virtual teams. High levels of Virtual Distance predict and explain low levels of trust [4],[5],[6],[7]. Team psychological safety is key to trust development and learning and higher levels of trust promote higher levels of information flow and knowledge sharing.

## **Organizational Citizenship Behavior (OCB)**

Organizational Citizenship Behavior (OCB) is defined as a set of behaviors team members exhibit that go beyond the scope of their job descriptions and formal roles and duties [17]. There is strong support for the relationship between trust and OCB [18] and also for relationships between trust and organizational commitment. Trust and commitment result in enthusiastic and cooperative behaviors, both of which are associated with OCB.



## Study 1

This study involved participants from a large, U.S.-based financial services. They have implemented a flexible work program that thousands participate in. Participants included global managers representing various functional areas. Eighty six out of 100 managers participated.

### Study 1: Procedure

Respondents completed the Virtual Distance Index questionnaire. We also included items to assess trust [16], OCB [17], learning [7].

The VDI, Trust and OCB were entered in a hierarchical regression analysis to test the hypothesis that VDI has a direct effect on Trust and OCB and an indirect effect (i.e., is mediated by Trust and OCB on Learning). Baron and Kenny (1986) defined three conditions for mediation: (1) significant correlations between the independent variable and the mediating variables; (2) significant correlations between the mediating variables and the dependent variable; (3) the independent variable is significantly correlated with the dependent variable but becomes non-significant when the mediators are added to a regression equation predicting the dependent variable.

### Study 1: Results

All conditions for the Baron and Kenny approach were met. Table 2 shows the correlations for all variables. The correlation between VDI and Trust was  $-.535$  ( $p < .01$ ); the correlation between VDI and OCB was  $-.486$  ( $p < .01$ ) and the correlation between VDI and Learning was significant ( $p < .01$ ) meeting the first condition. The second condition is also met as shown in Table 3. Table 3 shows the results of a hierarchical regression analysis with group learning as the dependent variable. In step 1 the coefficient for VDI is significant and negative as hypothesized. In step 2 the coefficients for Trust and OCB are both significant but the coefficient for VDI is near zero and non-significant.

**Table 2:** Study 1 Correlations

Variable	TRUST	OCB	LEARN
VDI	-.54**	-.49**	-.28**
TRUST		.60**	.44**
OCB			.41**

\*\*  $P < .01$  (one-tailed);  $N = 86$

**Table 3:** Study 1 Hierarchical Regression Analysis with Learning as Dependent Variable

Predictor	Step 1 Beta Weights	Step 2 Beta Weights
VDI	-.277**	-.008
TRUST		.292*
OCB		.232*
Multiple R	.277**	.475**

\*  $P < .05$  (one-tailed); \*\*  $p < .01$  (one-tailed);  $N = 86$

## Study 2

This study involved participants from a large pharmaceutical organization that implemented a work from home program. One of the major questions being investigated was does learning suffer from Virtual Distance.

### Study 2: Procedure

The procedure and methodology for Study 2 were the same as for Study 1. Table 4 shows the correlations for all relevant variables in Study 2. It can be seen that although the first condition for mediation is met (the correlations between VDI and Trust and between VDI and OCB were significant), the correlation between VDI and learning failed to reach significance. The mediation hypothesis for Study 2 was not supported. It should be noted that Study 2 had more limited power



than Study 1 due to the smaller sample size (n= 36). Since both sets of data included similar variables it was decided to test the mediation hypothesis with a combined dataset.

**Table 4: Study 2 Correlations**

Variable	TRUST	OCB	LEARN
VDI	-.40**	-.36*	-.21
TRUST		.72**	.43**
OCB			.52**

\* P<.05 (one-tailed) \*\* P<.01(one-tailed); N=36

## Combined Study Results

Table 5 shows the correlations between the relevant variables for the combined samples. It can be seen that condition 1 for mediation is met as the correlations between VDI and Trust (-.48; p<.01) and the correlation between VDI and OCB are significant (-.44; p<.01). Both mediators are also significantly correlated with Learning. Table 6 shows the results of a hierarchical regression analysis with VDI entered first and then Trust and OCB entered next. The coefficient for VDI is significant in the first step but becomes near zero and non significant in the second step when the two mediators, Trust and OCB are added. Coefficients for both mediators were significant (p<.01).

**Table 5: Combined Sample Correlations**

Variable	TRUST	OCB	LEARN
VDI	-.48**	-.44**	-.25**
TRUST		.64**	.45**
OCB			.46**

\* P<.05 (one-tailed) \*\* P<.01(one-tailed); N = 122

**Table 6: Combined Sample Hierarchical Regression Analysis with Learning as DV**

Predictor	Step 1 Beta Weights	Step 2 Beta Weights
VDI	-.250**	.005
TRUST		.270**
OCB		.285**
Multiple R	.250**	.501**

\* P<.05 (one-tailed); \*\*p<.01(one-tailed); N=122

## Discussion

In the present investigation we found that Trust and OCB mediate the impact of Virtual Distance on Group Learning. Conditions of high Virtual Distance can be highly problematic when learners are not sharing best practices and lessons learned from prior initiatives. If these results continue to hold in future research, organizations must act swiftly to minimize Virtual Distance. Reducing Virtual Distance will lead to better learning.

## Conclusion

Much of the research to date on virtual teams and virtual learning relies heavily on the construct of physical distance of learners. In contrast, Virtual Distance provides a richer, more predictive measure of key outcomes including social learning. If a virtual learner perceives him or herself to be distant from others, trust declines, citizenship behaviors declines and has a negative impact on learning. Further work should be conducted in educational settings to better understand the full extent and implication of this finding. As more and technology is used within the classroom or in place of a physical classroom altogether, the proper management and mitigation of virtual distance will become increasingly necessary.



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