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Evidence-based Team Development: Pre-post Assessment of Team Experiences with Team Coaching Intervention

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Abstract

With organizations becoming more team oriented, the need to have team training and development programs that show evidence of team development over time is becoming crucial. In this study we incorporated team development in a leadership-training program of a Midwestern University. 54 teams that went through the program and completed assessment over the two time periods and engaged in the team coaching process were used in this longitudinal case study. We tested six hypotheses of which three were supported, one partially supported and two not supported. Using paired t-tests, our major results show that the gap between the Desired and Actual Experiences in Time 2 is smaller than in Time 1 ($\bar{X}$ = -.11, p =.068) indicating team development; linear regression shows that this reduction in the gap does impact the internal evaluation from the team members (β = -.31, r^2 = .097, p < .05). We believe this study provides evidence that team development can be demonstrated and that further work could be done to contribute to this stream so as to meet the crucial need of team development in organizations and educational institutions.

Keywords: *team development, team assessment, evidence-based training*

INTRODUCTION

Across the globe, with the increasingly complex and volatile work environment organizations are recognizing the importance of developing their leaders and employees to increase internal capacity to innovate and enhance performance. A major shift in structural design to meet this need is to incorporate teams across all levels of organizations. Yet, most training programs are focused on developing individuals' leadership and supervisory skills. In the US alone, more than $156 billion is pumped into training programs (Miller, 2012). Despite this trend of becoming more team oriented structurally, few programs focus on developing teams in their actual work environment (e.g., Haeger, Lingham, & Richley, 2020) although numerous offsite team-building programs exist. Furthermore, with the need to constantly shift, adapt, and innovate, the current emphasis on 21st Century skills also emphasize the importance of team collaboration. After reviewing numerous scholarly, practitioner, and online sources it is quite evident that in very recent articles, very few team-training

programs focus on developing teams in their organizational context (Lancaster & Milia, 2014) with even less that provide evidence-based training for teams (Raes et al., 2015). In this paper we present a longitudinal study of evidence-based team development in a staff leadership development program in a Midwestern University. We included team assessment and team coaching (within their actual work context) to add to the very few team level training programs that include the longitudinal and/or cross-sectional approach of evidence-based training.

The fundamental shift toward a team-oriented organizational environment has created a push to incorporate team skills training or team development programs as an integral part of human resource development (London & Sessa, 2007) especially since the constant changing organizational environment requires team-level engagement to contribute to innovation and success in organizations. The need for teamwork skills was further supported a decade ago in the 2006 Corporate Recruiters Survey Report by the Graduate Management Admissions Council (GMAC) where 38% of recruiting organizations surveyed state that "soft skills" and "teamwork skills" are extremely important when hiring an MBA graduate into their organization. This in turn has resulted in an aligned shift in academia as educators and leaders recognize the dire need to include teamwork in their programs to for graduates (Prokesch, 2009). Examples of such effort include action learning programs (Revans, 1982; Raelin, 2006), T-Groups or sensitivity training (Faith, Wong, & Carpenter, 1995), and myriad forms of team-focused assignments. Merely creating teams in both organizational and educational contexts is not the answer to team development or enhancing team skills. Today, many individual focused leadership-training programs exist to help develop individuals but programs to develop teams are still very much in its infantile stage.

In this paper, we will first discuss training programs; how they are evaluated and the need for evidence-based training. We then present the team development program that we designed and delivered for a Midwestern University staff leadership training and present the findings from 64 teams that went through the 6-month program from 2009 to 2014.

TRAINING PROGRAMS AND EVALUATION APPROACHES

Defined as "the systematic acquisition of skills, rules, concepts, or attitudes that result in improved performance" (Goldstein, 1993: 3), training has become a fundamental part of organizational learning and change, and employee development. As organizations go through change, training has become an essential phase to support the change process and to promote innovation and new skills to help them thrive. Kassicieh and Yourstone (1998) cite Crosby (1979, 1984) in that training and education are viewed as key ongoing processes in support of organizational growth and advancement, and that training provides a forum for communication of new organizational strategy, new values, new tools, and new ways of performing work.

With the proliferation of training programs across the globe, managers at both national and international levels consider professional development a critical component to both managerial and organizational effectiveness (Hunt & Baruch, 2003). If one were to consider training as individual employee learning and as part of the ongoing process in organizational change, growth, or advancement, the program will have to be designed for organizations and their employees' specific needs (Richley & Lingham, 2021). However, and interestingly, many companies conduct training simply for appearance's sake (Hughey & Mussnug, 1997) instead of focusing on adult learning and development (Wills, 1994; Hollenback & Ingols, 1990; Humphrey, 1990), organizational responsibility to develop teamwork (Mahenthiran, Mackoy & Terpstra-Tong, 2021), or the enhancement of cognitive abilities (Carter, 2002). Although most training programs contain elements of learning and application of what has been learned, participants' responses to training have been framed as the extent to which they liked the program (Kirkpatrick, 1994). Since liking a program does not necessarily denote its importance to the individual, evaluations that include the participants' perceived importance would help organizations engage in double-loop learning

where any mismatch would be used to improve subsequent sessions (Argyris, 1992). Prior research demonstrates that a good training program is one that is developed around Experiential Learning Theory (Kolb, 1984; Vince, 1998) such that participants can learn and apply what they learned. Lingham and Richley (2018) proposes that team training and development requires training at three levels: individual, interpersonal and team.

The impact or outcomes of some training programs have been evaluated based on the cost and benefits of having such programs (Lewis & Thornhill, 1994), level of happiness indices (Paauwe &Williams, 2001), or customized programs focusing on content, applicability and perceived importance (Lingham, Richley, & Rezania, 2006). Still the focus on managerial training continues to increase with large corporations spending over $50 billion annually on related expenses (Katz, 1998). Furthermore, budgetary and other constraints have caused many trainers and instructional designers to employ standardized, commercially available evaluation instruments to evaluating training (McClelland, 1994). Axtell, Maitlis and Yearta (1997) suggest that effectiveness of training should be based on the extent to which trainees are able to apply the knowledge, skills and attitudes they obtained. Alliger and Horowitz (1989) highlight the concern that evaluating training programs have not considered actual measures to capture knowledge gained and retained. Evaluating training has been used to obtain continued support and commitment from organizations (Coffman, 1990) or to balance the costs and results of the training itself (Bushnell, 1990). In a review of the training and development literature since 2000, Aguinis and Kraiger (2009) reviewed about 600 articles, books, and chapters from multiple fields show very little evidence-based training at the team level. Aguinis and Kraiger (2009: 456) indicate that "team training emerges as an important intervention… benefits to team training is the knowledge of teamwork principles, communication and performance." Based on the definition of training as a systematic approach to learning and development to improve individual, team, and organizational effectiveness (Goldstein & Ford, 2002), we add to this definition (particularly at the team level) that the impact of training should be both based on evidence in research or development (as supported by Kruse, 2004; Yeung, 2014) and contextualized in their work environment (as supported by Lancaster & Milia, 2014).

Although it has been established that teams can offer greater adaptability, productivity, and creativity than individuals (Katzenback & Smith, 1993); provide more complex, innovative, and comprehensive solutions to solve organizational problems (Gladstein, 1984; Hackman, 1987; Sundstrom, Demuse, & Furrell, 1990); and contribute directly to organizational outcomes, the experience of working in teams is complex, dynamic, and non-linear. Hence, leading, managing teams, and being team members is complex with team experiences varying from rewarding to extremely frustrating. In essence, the positive contribution of teams to organizations is equally countered by the inherent difficulty experienced by organizational members to work in teams effectively (Lingham & Richley, 2018). We put forward that even though organizations and educational institutions have realized the significance of learning and development and have good training or development programs in place for individuals, team learning, coaching, and development programs are lagging behind. Toye (2015) specifically mentions that there are no quick fixes in team development but that only a programmatic coaching approach would be needed. The expectation that team training programs should result in team learning and development, attention must turn to one of the most important aspects in training—evidence of development. Although numerous individual level training programs exist where recent innovative approaches such as Richley and Lingham (2021), there are hardly equivalent programs that focus on team assessment, coaching and development. We agree with Lancaster and Milia (2014) that team training programs should focus on developing teams in their organizational context and demonstrate evidence of team development over time.

Based on recent literature, team training and development is crucial to organizations. Examples of some studies include: the effectiveness of teamwork in organizations (Khawam, DiDona, & Hernández, 2017); instant shift to virtual teamwork

due to COVID-19 (Klostermann, Ontrup, Thomaschewski & Kluge, 2021); focusing on the science of teamwork using Tuckman's 4-stage model (Johnson et al., 2021); and comparing teamwork across countries (Mahenthiran, Mackoy & Terpstra-Tong, 2021).

As suggested by researchers and practitioners, our paper involves assessing experiences of teams in their work context; a structured team coaching process; and a longitudinal assessment to demonstrate evidence of team development. Hence the question driving this design is whether teams that go through a training program involving assessment and coaching at the team level do improve the experiences in their team's work environment and if the development from time 1 (pre-coaching) and time 2 (post coaching) is significantly better. We hope the design and results of this study would contribute to this stream of work by: 1) using an evidence-based assessment so as to capture team experiences; 2) proposing a programmatic and approach to team coaching; and 3) showing evidence of team development from the team-training program.

METHODS

We used a longitudinal quantitative case study method to test the difference of teams' assessments from Time 1 and Time 2 and controlled for organizational culture variance by using teams that attended a leadership-training program that included team development from one Midwestern University. As part of a leadership training and development program, we collaborated with the university's Human Resources Department to include a team leadership component with the criteria that we assess the leader's team by capturing data from team members about their experience in their team in their work environment. As early team research (e.g., Cartwright & Zander, 1968; McGrath, 1991) and leadership studies (e.g., Blake & Mouton, 1964; Fiedler, 1967; Tannenbaum & Schmidt, 1973; Hersey & Blanchard, 1969) established that interactions between team members and between leaders and followers exist in a task-relational continuum. We decided to use the Team Learning Inventory[2)] (Lingham, 2005) as it captures four major dimensions of team interaction: 1) Diverging (i.e., non-task interactions); 2) Converging (i.e., task-related interactions); 3) Power and Influence (i.e., interactions that promote the ability of team members to contribute to the team and the organization); and 4) Openness (i.e., interactions that promote team members to voice any issues/concerns even if it is not related to the task). Authors Lingham and Richley (2015) put forward that teams which are both high performing and high functioning are "High-Impact Teams" and that the four dimensions capture both these aspects. Details of the dimensions, psychometrics, and validity can be found in Tables 1 and 2. Based on these criteria, the Human Resources Department agreed to use the TLI and agreed on including a structured team-coaching process and evaluating their team experience again after 4-6 months.

Sample

We collected data from all teams that had completed the team assessment (n=193) and narrowed it down to only the work teams from the Midwestern University (i.e., we removed student teams and teams from other organizations) that were engaged in the program. However, since not all teams completed the time 2 assessments, we only included the teams that had completed both their Time 1 and Time 2 assessments (to meet the criteria for paired t-tests) but also had 50% or more responses based on team membership (n=55). Using these criteria, and after removing missing values in the responses from internal team members from the dataset, we ended up having a total of 54 teams from different departments and schools or colleges. Although some of the teams did not have completed external evaluations we agreed that it was acceptable, as the analyses would only compare the cases that have the required data. The general descriptive information for these teams is shown in Table 3.

Table 1: Definitions of Each of the TLI Dimensions

Diverging (non-task-oriented) Interactions

Definition. The Diverging dimension is defined as the extent to which a team is engaged in valuing one another, connecting with one another and where team members have the freedom to be individuals and relate to each other. This interaction is not task or purpose focused. The Diverging Dimension of team interaction can be identified as those interactions that focus on non-task aspects which affects the socio-emotional dynamics in a team. There are 5 aspects to this dimension of team interaction.

Converging (task-oriented) Interactions

Definition. A team's Converging interaction is defined as the extent to which the team engages in decisions and is driven by agendas or directions that are related to the task or its purpose. This interaction is task or purpose focused. The Converging Dimension of team interaction is experienced as those that help the team accomplish a task, goal or objective. There are 3 aspects to this dimension of team interaction.

Power and Influence Interactions

Definition. A team's Power and Influence Interaction is defined as the extent to which members of the team have equal ability and opportunity to influence and contribute to the team's purpose, goals and tasks. A high level of this dimension is experienced when the team does not depend on a strong single leader instead members can contribute to exceed the leader's expectations and requirements of the team. When a team is young, usually they would expect to have strong leadership from the legitimate leader of the team. As a team matures, the nature of leadership should evolve to become one that is shared and where members feel they can both influence the team's purpose and goals while also feeling able to contribute to the team and not just to complete tasks assigned.

Openness Interactions

Definition. A team's Openness Interaction defined as the extent to which members focus on issues or ideas that are of interest or concern to individual members or the group as a whole. This dimension is focused on how safe and accepted team members feel in terms of promoting behaviors that are inclusive at the individual and team levels. This dimension is indicated by the ability and freedom for team members to return to previously discussed issues, to stay with issues, or to discuss issues or matters that are important to them (even if it leads to tangential discussions).

Table 2: Psychometrics of the Team Learning Inventory (TLI) from Lingham (2009)

ITEMS	Exploratory Factor Analysis ◄— Factors and Loadings —►				F	ICC for Items	Factors	Cronbach's α for Factors	ICC for Factorsa (rwgc)
	1	2	3	4					
ENG3	0.76				2.62	0.2***	Divergent	0.94	0.4*** (0.96)
ENG4	0.92		-0.21		5.05	0.4***			
ENG5d	0.43		0.28		2.37	0.2***			
AL1	0.70				4.92	0.4***			
AL3	0.67				2.68	0.2***			
AL5d	0.87		-0.21		4.36	0.4***			
IND1	0.74				4.98	0.4***			
IND3	0.71				5.12	0.4***			
IND5	0.57				3.64	0.3***			
REL1	0.73				3.67	0.3***			
REL4	0.77				4.42	0.4***			
REL5	0.75				1.92	0.2**			
SOL1	0.54			-0.25	3.27	0.3***			
SOL2d	0.42		0.22	-0.20	3.59	0.3***			
SOL4	0.77				3.95	0.3***			
SOL5d	0.48	0.31		-0.23	4.42	0.4***			
UND1	0.20	0.59			2.23	0.2***	Convergent	0.90	0.2*** (0.95)
UND2		0.66			2.52	0.2***			
UND3d		0.48			2.55	0.2***			
UND5	0.21	0.49			1.71	0.1**			
ACT2		0.87			3.88	0.3**			
ACT4		0.60			3.17	0.3***			
ACT5		0.69			3.69	0.3***			
PLA1		0.73			3.53	0.3***			
PLA2		0.83			3.46	0.3***			
PLA4		0.83			2.95	0.3***			
PNI1				0.63	2.49	0.2***	Status	0.75	0.4*** (0.76)
PNI2				0.75	4.07	0.4***			
PNI3				0.64	1.91	0.2**			
PNI5				0.63	5.16	0.4***			
OPEN1			0.60		1.56	0.1*	Recursive	0.82	0.3*** (0.90)
OPEN2			0.76		1.98	0.2***			
OPEN3			0.71		2.43	0.2***			
OPEN4			0.67		2.49	0.2***			
OPEN5	0.25		0.63		3.15	0.3***			
	◄— Correlations —►								
Convergent	0.46								
Status	0.65	0.27							
Recursive	-0.42	-0.07	-0.13						

a The Mean Squares, Fs, and df are not shown in this table for the factors. For simplicity, I have included the ICCs for factors as part of this table.

b The Reliabilities shown here are those for each factor. The overall $\alpha = .92$.

c IRRs were computed using the formula for multiple items (James, Damaree, & Wolf, 1984; 1993). The authors label this estimate as "rwg."

***significant at p<.000, **significant at p<.005, *significant at p<.02

d These items were removed resulting in the final 30-items used in the final version of the TLI.

Table 3: General Descriptive Data[a] of Teams Used in This Study

Major Groups	Number of teams	Men	Women
Schools/Research[b]	23	$\bar{X}$ = 1.83	$\bar{X}$ = 6.17
Administration[c]	31	$\bar{X}$ = 2.40	$\bar{X}$ = 7.10
Total	54	54	54[d]
Membership information			
Range of membership across all teams		3–21	
Range of men members across all teams		0–9	
Range of women members across all teams		0–21	

a Data was collected from six cohorts who attended the sessions from 2009-2015. Sessions began in November and ended in June/September.

b Schools and Research teams are from the Hard Sciences, Social Sciences, Student Affairs and Office of Research.

c Administrative teams are from Human Resources, Information Technology, Maintenance, and University Administration.

d The equal number of teams, men and women in the sample is purely coincidental.

Procedure and Data Collection

In the team development portion of the program, team leaders were given two weeks to have their team members (themselves included) complete the internal Team Learning Inventory or TLI (Lingham, 2005) to capture the actual and desired experience of team interaction for their team. At that time, team leaders also sent out an external survey of the TLI to supervisor(s) and clients/customers they work or engage with to respond to how these external members experience their team. Having results (quantitative and qualitative) from both internal and external assessors create a 360° assessment of the team.

After the two-week time allocated, the TLI reports were generated, and this data was used as that for Time 1. Within a week, another session was held for the team leaders to first explain the evidence based TLI research and discuss the various aspects, profiles, qualitative comments from members and external evaluators in their reports, and the gaps based on the profiles between the team's assessment of their actual interaction experienced and the desired interaction experience they would like to have. The team leaders were then given time (about 30 minutes) during the session to go through their team reports individually and clarify any questions they might have. The team leaders then proceeded to schedule a one-on-one meeting with the team coach and the two-hour team coaching session within a 3–6-week period based on the availability of the team coach and the ability for the entire team members (which is best) to attend.

During the one-on-one meeting between the team leader and the team coach, they went over the results of their report and gave the team coach a little more detail to get a better understanding of the members in the team. The scheduled two-hour team coaching session followed the one-on-one meeting, and this is when the coach met with the entire team with everyone having a copy of the report. During the coaching session the team coach went through the entire report with the team to make sense and understand the results. The team coach also revisited the team's purpose and identity in the organization and to allow the team to collaboratively identify critical aspect(s) of team interaction they would like to develop based on the extents of the gaps between the actual and desired interaction. Based on this, the team collectively decided to develop new behaviors, norms, and practices to move those critical aspects of their team interaction toward their desired interaction profile. The team was given between four to six months after the team coaching session to practice the new behaviors, norms, and any other aspect they deem important to work on to move toward their desired interaction. After this period, the team coach again sent the internal and external TLI instructions to the team leader, and the leader sent out these instructions to both the internal team members and the external evaluators as they did in Time 1 within a two-week window. As in most 360°

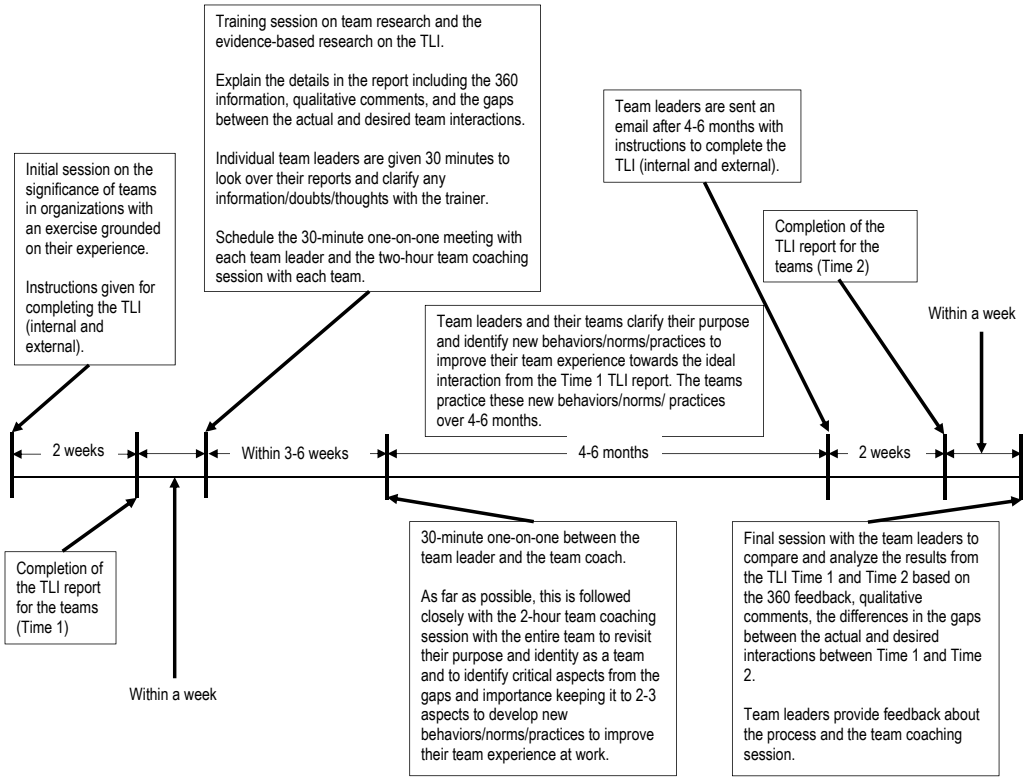

Figure 1: Details of the Procedure and Process for the Team Development Program

assessments, it is usually difficult to collect external assessment from the same people and therefore it is acceptable to get different external evaluators if needed. This was used as data for Time 2.

Once the reports for Time 2 were generated, within a week a final session with the team leaders was conducted where the team leaders could compare their Time 1 and Time 2 reports based on the 360° feedback, the qualitative comments, and the differences of the gaps between the actual and desired interaction and to what extent the critical aspects decided (or other aspects) have improved or if they became worse. Team leaders paired up and discuss their Time 1 and Time 2 reports as a peer coaching approach. The team leaders offered feedback about the process and the team coaching session they experienced and if there were any feedback from the team members as well. Due to the complex process used, we present a more detailed diagram depicting this procedure and process in Figure 1 below.

Hypotheses

To show the impact of team coaching, the teams should develop (i.e., improve) as shown by their scores for the team's actual and desired experiences for Time 1 and Time 2, respectively. We therefore also expect the actual experience of team experience for Time 2 should be greater than Time 1. Similarly, we also would expect that the desired experience for Time 2 be greater than Time 1. Diving even deeper, we also would expect that the difference between the actual experience for T2 and the actual experience for Time 1 to be positive and significant. The same is expected for the desired experience between Time 2 and Time 1. As such our hypotheses are:

Hypothesis 1: The overall actual experience score in T2 is positively and significantly better than the overall actual experience score in T1.

Hypothesis 2: The overall desired experience score in T2 is positively and significantly better than

the overall desired experience score in T1.

Hypothesis 3: The gap between the desired experience and the actual experience in T2 is smaller (negatively) and significantly than that of T1.

As the teams are expected to develop positively, the internal team evaluation (performance, member satisfaction and psychological safety) and the external evaluation (positive experience and comparison with other similar teams) for Time 2 should be better than those in Time 1. Hence:

Hypothesis 4: The external evaluation in T2 is positively and significantly better than the external evaluation in T1.

Hypothesis 5: The internal evaluation in T2 is positively and significantly better than the internal evaluation in T1.

Finally, to show the impact of the team coaching, we also hypothesize that the reduction in the gap between the desired experience and the actual experience from Time 2 and Time 1 would also improve team members' internal evaluation (i.e., the internal experience of Time 2 minus the internal evaluation of Time 1). To test this hypothesis, to test for evidence of impact, we would then run a linear regression analysis using the improvement of their internal evaluation as the dependent variable. Hence,

Hypothesis 6: The reduction in the teams' gap between the desired experience and the actual experience from T2 to T1 positively and significantly affect the teams' internal evaluation at T2.

Analytical Approach

As the design of this study is aimed at answering the question whether teams that are included in a training development program do show empirical evidence of development by collecting pre- and post-measures using a team level 360° survey that included a two-hour structured team coaching process between the pre- and post-measures. The most appropriate analytical approach would be paired t-tests as the same teams undergo both Time 1 and Time 2. We also intend to use regression to explore if the actual experience of team interaction does affect how external evaluators assess their own experience with the team. We intend to also conduct post-hoc analysis to dive deeper into the data to identify any other findings that would emerge.

FINDINGS

As this study is aimed at showing if teams develop before and after team coaching, we had to first test for homogeneity of variance between Time 1 (i.e., gap between desired and actual experiences) and Time 2 (i.e., gap between desired and actual experiences). We also tested for homogeneity of variance between the differences between the gaps in Time 1 and the gaps in Time 2 for the teams. Once shown that the variances are the same the paired t-test can be used to test our hypotheses. As the results show $p>0.1$ we can conclude that the variances are equal (see Table 4).

We then tested the pairs in each hypothesis to see if there are significant correlations for each of these from Time 2 and Time 1 to determine the tendency of rating (high or low) in Time 2 to that of Time 1. When running the Paired Samples Correlations to look at the correlations among the pairs, Pair 1 ($r=.425$, $p<.005$); Pair 2 ($r=.10$, n.s.); Pair 3 ($r=,046$, n.s.); Pair 4 ($r=.374$, $p<.03$) and Pair 5 ($r=.694$, $p<.000$). Based on the correlations, teams that rated high on their actual experience in Time 2 also rated high on the experience in Time 1 (Paired t-test 1); external evaluators that rated their experience high for teams in Time 2 also rated their experience high in Time 1 (Paired t-test 4); and team members who gave high evaluations for the team in Time 2 also did the same in Time 1 (Paired t-test 5). The weak correlation between the desired experience in Time 2 and Time 1 can be expected depending on what each member of the team wants in their experience. The finding that there is also a weak correlation in the difference between the gaps (Desired – Actual) for Time 2 and Time 1 is encouraging as we expect each team to be developing in different ways, as each team is unique. Finally we ran the paired t-tests for Hypotheses 1-5. The results are also shown in Table 2.

From the table, there is strong support for Hypotheses 1 and 2, support for Hypotheses 3 and

Table 4: Test of Homogeneity of Variance and the Paired t-tests for Hypotheses 1–5

Test of Homogeneity of Variance									
Gaps Between Actual and Desired Experiences					Levene's Statistic		df1	df2	sig.a
T1 (Desired-Actual) Gap					0.448		1	52	0.5060
T2 (Desired-Actual) Gap					0.01		1	43	0.9230
T2 Gap – T1 Gap					0.78		1	43	0.3820
Paired t-tests Where Pair 1- Pair 5 Represents Hypotheses 1–Hypothesis 5 Respectively									
		Mean	sd	se	95%C.I.				
					Lower	Upper	t	df	sig.
Paired t-test 1	AET2 – AET1[c]	-0.28	-0.39	-0.06	-0.39	-0.16	-4.84	44	0.000
Paired t-test 2	DET2 – DET1	-0.47	0.69	0.10	-0.67	-0.27	-4.63	45	0.000
Paired t-test 3	GPT2 – GPT1	-0.11	0.40	0.06	-0.23	0.01	-1.87	44	0.068[b]
Paired t-test 4	EXTT2 – EXTT1	0.33	1.04	0.17	-0.01	0.68	1.95	36	0.059[b]
Paired t-test 5	INTT2 – INT1	0.07	0.36	0.06	-0.04	0.18	1.26	41	0.214
Hypotheses Support									
Hypothesis 1							STRONGLY SUPPORTED[d]		
Hypothesis 2							STRONGLY SUPPORTED		
Hypothesis 3							SUPPORTED		
Hypothesis 4							SUPPORTED		
Hypothesis 5							NOT SUPPORTED		

a The Levene's test for homogeneity all had $p > 0.01$ confirming that the two groups have equal variance.

b Although the significance level is slightly larger than $p < .05$, we accepted the results as supportive of H3 and H4.

c In this column, "AE" is Actual Experience; "DE" is Desired Experience; "GP" is the Gap (value obtained by subtracting the Actual Experience from the Desired Experience); "EXT" is assessment from the external evaluators; "INT" is the internal assessment from team members; and "T1" and "T2" represents Time 1 and Time 2, respectively.

d We indicate partial support as the standard deviations were much smaller in Time 2 (s.d. = .23) versus Time 1 where (s.d. = .42) – a decrease of 45%.

Table 5: Linear Regression Results to Test the Impact of Coaching on Difference in Internal Assessment from T2 and T1 (Hypothesis 6)

ANOVA RESULTS with DV (GAPINTEVAL) and IV (T2GAPT1GAP)[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.514	1	0.514	4.288	0.045
	Residual	4.798	40	0.120		
	Total	5.313	41			
REGRESSION RESULTS[b]						
	Standardized Beta	R Square	Adjusted R Square	Std. Error of the Estimate	t	Sig
1	-0.311	0.097	0.074	0.346	-2.071	0.045

a "GAPINTEVAL" is the difference from the team members evaluation of the internal assessment (T2-T1); "T2GAPT1GAP" is the gap between the Desired Experience and the Actual Experience from T2 and T1.

b The regression results used the same DV and IV to test Hypothesis 6.

4, but Hypothesis 5 is not supported. We are very encouraged that four of the five hypotheses were supported indicating that teams can develop (with empirical support) using the assessment and structured team coaching process using in the training.

In testing Hypothesis 6, results show that the reduction in the gap between the desired experience and the actual experience (Time 2 minus Time 1) does have a positive and significant impact (β = -.31, r_2 = .097, p < .05) on the difference between the internal assessment of team members (Time 2 minus Time 1). This shows that the team coaching does have an impact on the team's internal evaluation explaining 9.7% of the variance. See Table 5.

DISCUSSION

As discussed in the first two sections of this paper, very few team training programs focus on developing teams in their organizational context (Lancaster & Milia, 2014) with even less that provide evidence-based training for teams (Raes et al., 2015).

Also highlighted in the review conducted by Aguinis and Kraiger (2009) across multiple fields show very little evidence-based training at the team level. As organizations shift toward team-oriented designs across levels, the need to incorporate team-skills training or team-development programs is evident (London & Sessa, 2007) which is also supported by Aguinis and Kraiger (2009: 456) indicating that "team training emerges as an important intervention…" Furthermore, recently, Lancaster and Milia (2014) put forward that it is important not only to focus on team development training but to also demonstrate that teams do develop with the intervention of team training and development programs. Such evidence can perhaps be best demonstrated in a team development program that has at least two time periods (i.e., a longitudinal approach).

The Midwestern University Human Resources Department collaborated with us as consultants to design and deliver such a design specifically for team assessment and development involving their work context. This offered the possibility to actually develop a team training program over two time periods with a team level intervention (team coaching) embedded between these two time periods. It was also critical to select a valid robust team level 360° assessment that focuses on how the teams experience their interaction in their organizational context. As mentioned, we used the TLI (Lingham, 2005) as it has been demonstrated over the past 15 years as robust, valid and reliable in diverse organizations in the US and across the globe. With the possibility to assess teams in a 360° approach and in two time periods (Time 1 before team coaching and Time 2 after team coaching) we were inspired to demonstrate that team development can be demonstrated over time if there is a programmatic structured team training program in place (Toye, 2015).

The results in the team development program is very encouraging as we could show that the teams did develop in how they experienced their team interaction in the work environment (H1) with a smaller and significant gap between these two time periods. The result shows that although the mean ($\bar{X}$ = -.28) is smaller (Time 2 minus Time 1) the smaller standard deviation between in Time 2 (s.d. = .23) versus that of Time 1 (s.d. = .42) indicates that the variance in Time 2 is tighter and hence better than that in Time 1. A tighter variance indicates that members ratings were closer to each other (closer agreement) when assessing their actual team experience. Hypothesis 3 also supports this as the gap between the Desired and Actual Experiences in Time 2 is smaller than in Time 1 ($\bar{X}$ = -.11, p =.068). This is a very encouraging result as it shows that the actual and desired experiences are much closer in Time 2 than in Time 1. This indicates that after the team coaching session, there was a much smaller gap (significant at, p =.068) in the teams' assessment which demonstrates with empirical evidence that the teams do develop.

The strong support for Hypotheses 1 and 2 was encouraging as we were not only interested if there was a change in the actual experience of the teams but also their desired experience. We were also encouraged that the external evaluators rated the team significantly higher (or better) in Time 2 versus Time 1 ($\bar{X}$ = .33, p =.059). This is another demonstration of the development of the team with evidence to support that the team, as part of a larger system, did better after the team coaching.

Although we were disappointed that Hypothesis 5 was not supported, when we tested Hypothesis 6 for impact, the evidence shows that the reduction in the gap between the desired experience and the actual experience from Time 1 and Time 2 does impact the internal evaluation from the team members. Our evidence (β = -.31, r^2 = .097, $p < .05$) shows that with a unit decrease in the gap from Times 1 to 2, a team's internal evaluation reduces by .31 units which also explains 9.7% of the variance. The finding that this decrease in the gap being significant at $p < .05$ is indeed clear evidence that the team coaching process does indicate that teams actually develop.

LIMITATIONS AND FUTURE RESEARCH

One of the limitations of this study is that all the teams were from one organization. Although we indicate that we decided to use the case study approach so as to control for organizational culture, we will need further research to include team training and development from different organizations. One of the constraints in such studies is to be able to keep the same teams in both Times 1 and 2. With different teams, we will not be able to show development based on paired t-tests. This constraint limited our sample size to 54 teams, which we feel is adequate for this case study. Having larger sample sizes from more organizations would help further our understanding in evidence-based team development. We realize our study offers a methodology and programmatic structure to demonstrate evidence of team development and we hope this would spur further studies in this stream of work to meet the need of having such team training and development programs in both organizations and educational institutions. One such critical field is healthcare, with the initial declarations of the importance of health professionals working in teams reported over 22 years ago (Institute of Medicine, 1999, 2003), numerous studies on teamwork have been burgeoning (e.g., Courtenay, Nancarrow, & Dawson, 2013; Chiocchio, Rabbat, & Lebel, 2015; Wallin, Kalman, Sandelin, Färnert, Dahlstrand, & Jylli, 2015; Galleta-Williams et al., 2020; and Unoki et al., 2020).

CONCLUSION

The fundamental shift toward a team-oriented organizational environment has created a push to incorporate team-skills training or team-development programs as an integral part of human resource development (London & Sessa, 2007). We also see the trend in educational institutions focusing on teamwork in their curriculum to be able to have graduates that can enter the team-oriented work world and succeed. In this paper our intent is to contribute to the critical need to design team training and development programs that show empirical evidence that the teams do actually develop in a longitudinal approach. Our results are very encouraging as we were able to show evidence of team development using the TLI, which is a team 360 system. One of the reasons that team development is difficult to ascertain is partly due to the lack of a robust, valid, and reliable team level assessment of the overall experience in a team when working in the organizational context. Although most team researchers have dissected the world of teamwork into specific aspects (e.g., design, diversity, brainstorming, etc.), a call to focus on team interaction in their organizational context was put forward by Paul Hare in 2003. Organizations are becoming more interested in team training and development programs but the lack of evidence of team development has pushed researchers and practitioners to collaborate to develop team level evidence-based training. In the healthcare context, a recent study focused on developing effective teamwork among nursing students showed very promising results (Petty & Lingham, 2019).

As we stated earlier, we hope the design and results of this study would contribute to the stream of evidence-based team development programs by: 1) using an evidence based assessment so as to capture team experiences; 2) proposing a design that supports the need to create a structured programmatic approach involving team coaching; and 3) showing evidence of team development from the team-training program. Colquitt, and Jackson (2006: 872) support our approach to assess the actual and desired experiences as team members interact in the work environment when they mention "that teams create a context in which future

interactions occur." Our study on the two states of the experience of teams (i.e., actual and desired team interactions) aligns with the recent stream of team research focusing on the importance of team interaction (e.g., Hare, 2003; Wittenbaum et al., 2004) and that teams experience emergent states (e.g., Colquitt, Noe, Jackson, 2002).

As organizations become more team oriented and some even global, such a method to capture evidence-based training for teams is not only necessary but also critical. Since the 1940s, team researchers have been interested in team development but since the late 1980s the focus on team development increased dramatically as: 1) organizations are using teams extensively; and 2) the move to include training and development as part of Human Resources with a recent focus on developing teams. Due to these reasons and that this method can be used globally, we believe this paper aligns with the topics indicated and useful for organizational leaders who intend to develop High-Impact Teams and Engagement and International Human Resources Professionals who could use this process to help leaders in their organizations. The dire need to have team training and development programs with evidence of development would help organizations create more such programs to help teams thrive in organizations. Hence, it is our intention to provide evidence that team development programs can and should be done to meet organizational and educational needs as the focus on team-oriented designs continues to be critical for success internationally. We also hope that others would also continue this stream of work by conducting more team level training and development programs using such a longitudinal methodology across more diverse teams both nationally and globally.

NOTE

1) Please direct all correspondences to Tony Lingham.
2) The TLI is a proprietary instrument and is not readily available. We obtained the author's permission to use it in this study.

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