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Article

A Study on Psychological Safety, Team Learning Behavior, And Its Effects on Team Efficacy and Team Effectiveness Between Teams of Blue-Collar Employees

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Abstract: The conviction that voicing one's opinions won't result in punishment or humiliation is known as Psychological Safety. Learning behaviour is a shift in attitude and conduct brought about by practice, education, training, and experience. Team efficacy is the belief held by all members of the team that they are capable of working effectively together. The ability of a team to achieve its goals and objectives over time is known as team effectiveness. The study is focused on understanding the level of Psychological Safety(PS), Team Learning Behaviour(TLB), Team Efficacy(TE), and Team Effectiveness(TEF) between teams and the correlation between them. The data required for the study was collected through a questionnaire through physical interaction, and the respondents were 100 employees from the manufacturing unit of the automobile industry at Dharwad i.e., 50 from Team 1 and 50 from Team 2. Two teams were considered so that a comparison on the perception of those teams could be made on Psychological Safety, Team Learning Behaviour, Team Efficacy and Team Effectiveness. Further statistical tool the Mann–Whitney U Test was applied to find the statistically significant differences between the perceptions of two Teams on the above parameters, as the data was not normally distributed and a Correlation matrix was done to understand the intercorrelation of Psychological Safety with Team Efficacy and Team Effectiveness, Team Learning Behaviour with Team Efficacy and Team Effectiveness. The results showed that for all four variables ie, Psychological Safety, Team Learning Behaviour, Team Efficacy, and Team Effectiveness, the alternative hypothesis was accepted. According to the overall mean findings, it was found that Psychological Safety, Team Learning Behaviour, Team Efficacy, and team effectiveness were high in Team 1. Inter-correlations were calculated and it was found that Psychological Safety with respect to Team Efficacy and Team Effectiveness there was a moderate degree of correlation, and with respect to Team Learning Behaviour and Team Efficacy, there was a moderate degree of correlation and for Team Learning Behaviour and Team Effectiveness, there was a high degree of correlation.

Keywords— Psychological Safety, Learning Behaviour, Team Efficacy, Team Effectiveness, Mann Whitney U Test.

INTRODUCTION

Teams play a crucial role in highly effective organizations. Teams perform better than individuals (Glassop, 2002), becoming sources for firms' sustainable competitive advantage. Through inter-group interaction, the knowledge gained by teams contributes to performance on an organizational level (Edmondson, 2012). There is a growing concern about how to improve the performance of teams in organizations.

In todays' organisations much work is accomplished collaboratively, which involves integrating perspectives, sharing ideas and information, and coordinating tasks. This collaboration often takes place at a team level. Teams are defined by the necessity for different individuals to work together to achieve a shared goal (Hackman, 1987). Working in teams is not always easy, different teams show great variation in their effectivity and performance output (Hackman, 1990). Edmondson (2004), has argued that Psychological Safety plays an important role in this process. Psychological Safety describes a team climate characterized by interpersonal trust and mutual respect in which people feel comfortable being themselves and dare to take interpersonal risks. Previous research (Edmondson, 1999;2003; Baer & Frese, 2003; Brown & Leigh, 1996) has linked Psychological Safety with better organisational learning outcomes and increased performance,

Team Psychological safety (TPS) is a shared belief that people feel safe about the interpersonal risks that arise concerning their behaviours in a team context (Edmondson,2018). "Project Aristotle," which explored over 250 team-level variables, found that successful Google teams have five elements in common: Psychological Safety, dependability, structure and clarity, meaning, and impact of work (Google, 2015). The findings argue that Psychological Safety is the most critical factor and a prerequisite to enabling the other four elements. However, surprisingly, despite the importance of that psychological factor, only 47% of employees across the world described that their workplaces are psychologically safe and healthy (Ipsos, 2012). Psychological Safety could affect behavioural outcomes such as team's creativity (Madjar and Ortiz-Walters, 2009), and both individual learning (Carmeli and Gittell, 2009; Carmeli et al., 2009) and team learning (Edmondson, 1999; Wonget al., 2010).

Team learning behaviour (TLB) is a symbolic variable that affects Team Effectiveness (TEF). TLB is the process by which members interact, acquire knowledge and skills needed for their work, and share information (Argote et al., 1999), and it raises the team process level to generate performance-oriented ideas. When members learn and improve their problem-solving skills, they can create a competitive organization (Dyer and Nobeoka, 2000).

Psychological Safety has been linked to several attitudinal outcomes as well. Another factor that drives TEF is efficacy. Team efficacy (TE) is a member's assessment of team ability to perform job-related activities successfully (Walumbwa et al., 2004). Confidence in the team's abilities affects performance and aligns the members' activities on the team level (Gibsonet al., 2000; Gully et al., 2002).

The effectiveness criteria for defining a team's performance are not limited to the team's physical output. In addition to productivity, most studies adopted team member satisfaction, attitudes, and perceived outcomes as essential measures. The most widely used are performance and attitude aspects. In this study, TEF is measured by a team's perception of their performance (Kim et al, 2020).

REVIEW OF LITERATURE

Edmondson, 1999 introduced the concept of team Psychological Safety, which is a shared belief among team members that the team is safe for interpersonal risk-taking. This construct, along with team efficacy, was found to have effects on learning and performance in organizational work teams

Cunha et. al., 2000 built on this research by identifying critical factors that influence learning and performance in teams, further emphasizing the importance of team learning for overall team effectiveness

Van den Bossche et al., 2006 examined how team members' interactive learning behaviours influence team efficacy. Their findings indicated that mutual sharing of knowledge and collaborative problem-solving enhance members' confidence in achieving team goals.

Ashauer et. al., 2013 conducted a study on how leaders can foster team learning, finding that Psychological Safety and learning behaviour were higher in teams with mastery goals compared to performance goals or no goal instructions. Team Psychological Safety was identified as a mediator between goal instructions and learning behaviour.

Albritton et. al., 2019 also highlighted the role of Psychological Safety and learning behaviour in the development of effective quality improvement teams, emphasizing the importance of creating an environment that supports team-based activities.

Kim et. al., 2020 explored how Psychological Safety affects team performance, finding that Psychological Safety did not directly impact team effectiveness. This suggests that while Psychological Safety is important for team learning and behaviour, its effects on team performance may be mediated by other factors such as efficacy and learning behaviour

Suh et. al., 2021 investigated the mediating effect of Psychological Safety and silent climate in the relationship between a team leader's self-deception behaviour and team learning. The study emphasized the authenticity of team leaders as a crucial element for organizational communication and effectiveness,

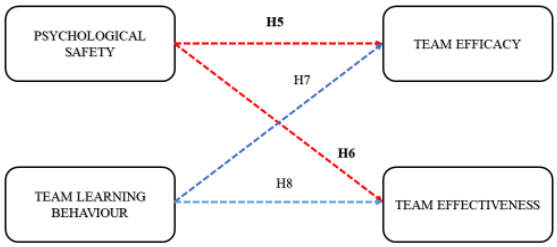
highlighting the importance of creating a psychologically safe environment for team learning.

Overall, the literature suggests that Psychological Safety, learning behaviour, and team efficacy play crucial roles in team effectiveness. Creating an environment that fosters Psychological Safety and supports learning behaviour can lead to improved team performance and effectiveness, ultimately contributing to organizational success.

PROBLEM STATEMENT

Organizations are gradually recognizing the value of psychological assets, the importance of synergy among individuals and groups for innovation and growth in highly competitive markets (Donaldson et al., 2011). There is a need to verify the influence of Psychological Safety on group performance, enhancing its explanatory potential and applicability in the workplace. Team Efficacy has a vital role in team research (Rico et al., 2011). As the importance of creating team-based outcomes has grown, Team Efficacy has attracted the interest of researchers (Day et al., 2009). Concepts such as team performance, characteristics, and attitudes of team members comprehensively define Team Effectiveness (Shen and Chen, 2007). It is difficult to measure or give Team Effectiveness as a single definition. When people on a team possess Psychological Safety, they feel able to ask for help, admit mistakes, raise concerns, suggest ideas, and challenge ways of working and the ideas of others on the team, including the ideas of those in authority which increases Team Efficacy and Effectiveness. Team Learning Behaviors include sharing information, asking questions, seeking and giving feedback, reflecting on performance, and discussing errors which creates a positive working environment and increases Team Efficacy and Effectiveness

CONCEPTUAL FRAMEWORK



OBJECTIVES OF THE STUDY

- To know whether the data is normally distributed for Psychological Safety, Learning Behavior, Team Efficacy and Team Effectiveness among the teams i.e.-Team 1 and Team 2.
- To compare the level of Psychological Safety, Learning Behavior, Team Efficacy and Team Effectiveness among the teams i.e.-Team 1 and Team 2.
- To know if statistically there is significant difference between the perception among team members of Team 1 and Team 2 on Psychological Safety, Learning Behavior, Team Efficacy and Team Effectiveness.
- To analyze the intercorrelation between Psychological Safety with Team Efficacy and Team Effectiveness, Learning Behavior with Team Efficacy and Team Effectiveness

HYPOTHESIS OF THE STUDY

- **H1:** Difference between the employees of Team 1 and Team 2 with regards to Psychological Safety is statistically significant.
- **H2:** Difference between the employees of Team 1 and Team 2 with regards to Learning Behavior is statistically significant.
- **H3:** Difference between the employees of Team 1 and Team 2 with regards to Team Efficacy is statistically significant.
- **H4:** Difference between the employees of Team 1 and Team 2 with regards to Team Effectiveness is statistically significant.
- **H5:** There is a positive correlation between Psychological Safety and Team Efficacy
- **H6:** There is a positive correlation between Psychological Safety and Team Effectiveness
- **H7:** There is a positive correlation between Learning Behavior and Team Efficacy
- **H8:** There is a positive correlation between Learning Behavior and Team Effectiveness

METHODOLOGY

i. TYPE OF RESEARCH-

This study uses descriptive form of research. Descriptive research provides the researchers with a general understanding of the problem and seeks conclusive data to answer question necessary to determine a particular cause of action.

ii. STUDY AREA-

The study was conducted in a prominent manufacture unit of automobile industry. The company has 8 departments and over 415 employees. The various products manufactured by the company are end yoke, slip yoke, tube yoke, yoke shaft, tube shaft and universal joint. The production department has 19 teams consisting of 8-30 members in each team.

iii. SAMPLE UNIT-

The sample unit taken for the study are the shop floor employees (Operating Engineer's) from production department

iv. SAMPLE SIZE-

The sample size of 50 employees from Team 1(Team End Yoke) and 50 employees from Team 2 (Team Slip Yoke) are taken, hence in total sample size chosen for the study is 100 respondents from teams in production department.

v. SAMPLING METHOD-

The respondents were chosen on the basis of probability method of sampling called stratified sampling.

vi. METHOD OF ANALYSIS-

Raw primary data was collected with the help of a questionnaire. The raw data was then tabulated. Based on this bar chart and pie chart were prepared. Analysis was conducted and interpreted. Conclusions were drawn based on that.

vii. STATISTICAL TOOLS FOR ANALYSIS-

Statistical tools such as, Means, Normality test (Shapiro Wilk test), Mann Whitney U test, Spearman's rank order Correlation were used to draw the findings.

viii. MEASUREMENT INSTRUMENTS AND VARIABLES -

All 26 items adopted a Likert 4-point scale, from 1 = Strongly Disagree to 4 = Strongly Agree for the following variables:

1. **PSYCHOLOGICAL SAFETY-**Team Psychological Safety consisted of seven questions by Edmondson (1999). Sample items were as follows: "Members are criticized when making a mistake," "Members often ignore individual's opinion," and "Members do not degrade other people's efforts."

2. **TEAM LEARNING BEHAVIOR-**Team Learning Behavior adopted seven items from Gibson and Vermeulen (2003). Sample items were as follows: "The team's ideas and practices are introduced to other teams," "Members exchange ideas," and "The team leaves documents about the details of work."

3. **TEAM EFFICACY-** For measuring TE, we adjusted seven items by Riggs and Knight (1994). Sample items were as follows: "Members have the best work skills," "Members have above-average ability," "The team has excellent performance compared to other teams."

TEAM EFFECTIVENESS-Team effectiveness was adapted from Williams and Anderson (1991), with the following sample items: "Fulfilling responsibilities given by the organization," "Achieving the level of task that we expect," and "Meeting official performance requirements"

ANALYSIS AND RESULTS

I. NORMALITY ANALYSIS

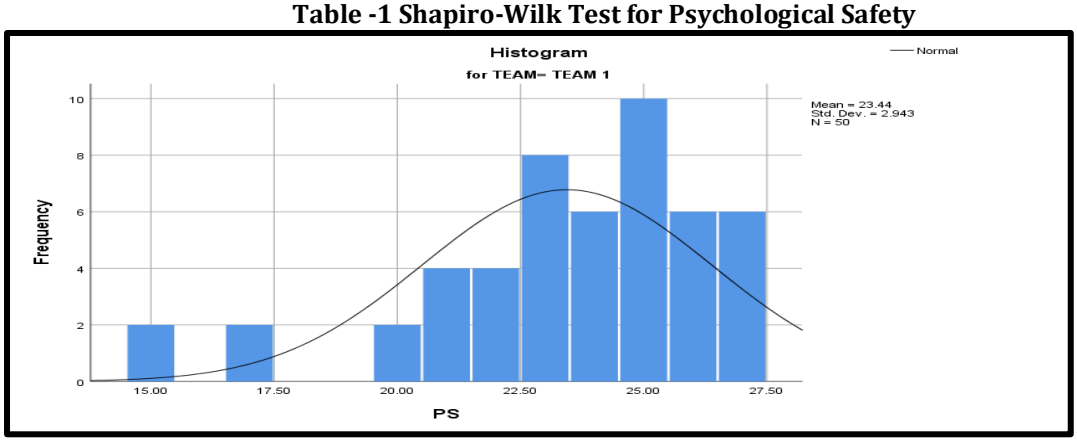
PSYCHOLOGICAL SAFETY

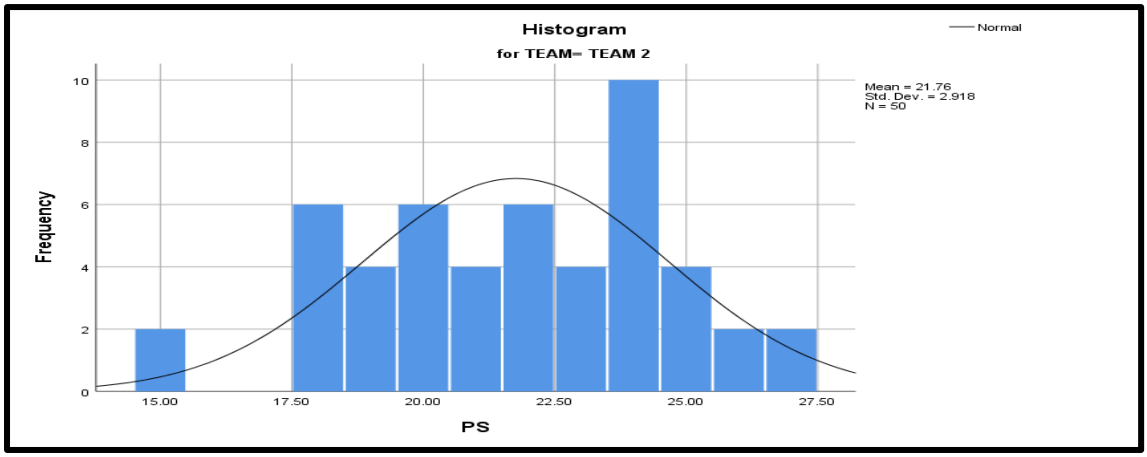
H0: Sampling is normally distributed for Psychological Safety with respect to Team 1 and Team 2.

H1: Sampling is not normally distributed for Psychological Safety with respect to Team1 and Team 2.

		Shapiro-Wilk		
	TEAM	Statistic	df	Sig.
PS	TEAM 1	.884	50	.000
	TEAM 2	.962	50	.112

Table -1 Shapiro-Wilk Test for Psychological Safety





Graph-1 Normality Graph of Psychological Safety

From **table no- 1** The significance value of Psychological Safety with respect to Team 1 and Team 2 are 0.000 and 0.112 which are lesser than α = 0.05, and greater than α = 0.05 respectively. Hence, we accept the alternate hypothesis for Team 1, that is the sample is normally distributed for Psychological Safety, and for Team 2, we accept the null hypothesis and so we conclude that sampling is normally distributed

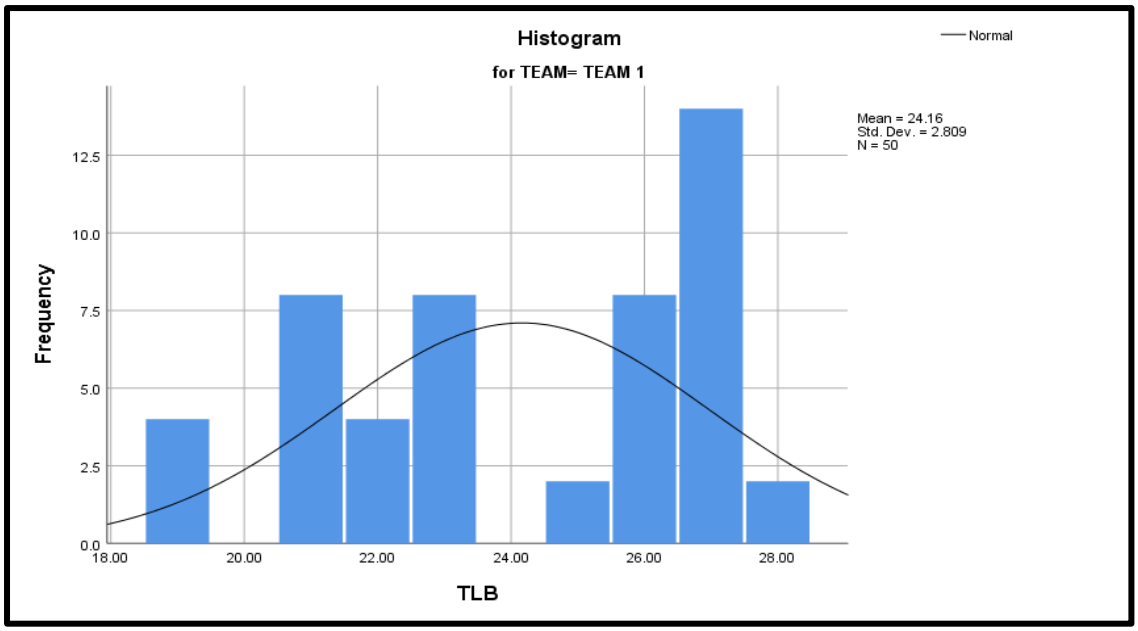
TEAM LEARNING BEHAVIOR

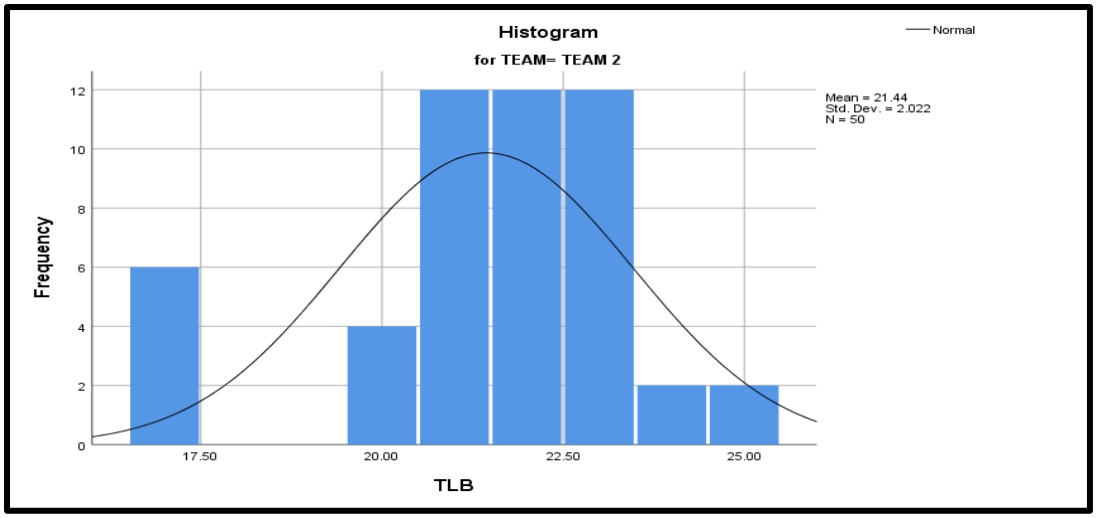
H0: Sampling is normally distributed for Team Learning Behavior with respect to Team 1 and Team 2.

H1: Sampling is not normally distributed for Team Learning Behavior with respect to Team1 and Team 2

		Shapiro-Wilk		
	TEAM	Statistic	df	Sig.
TLB	TEAM 1	.879	50	.000
	TEAM 2	.873	50	.000

Table -2 Shapiro-Wilk Test for Team Learning Behaviour





Graph-2 Normality Graph of Team Learning Behaviour

From **table no- 2** The significance value of Psychological Safety with respect to Team 1 and Team 2 are 0.000 and 0.000 which are lesser than α = 0.05, Hence, we accept the alternate hypothesis for Team 1 and Team 2 that is the sample is not normally distributed for Team Learning Behaviour.

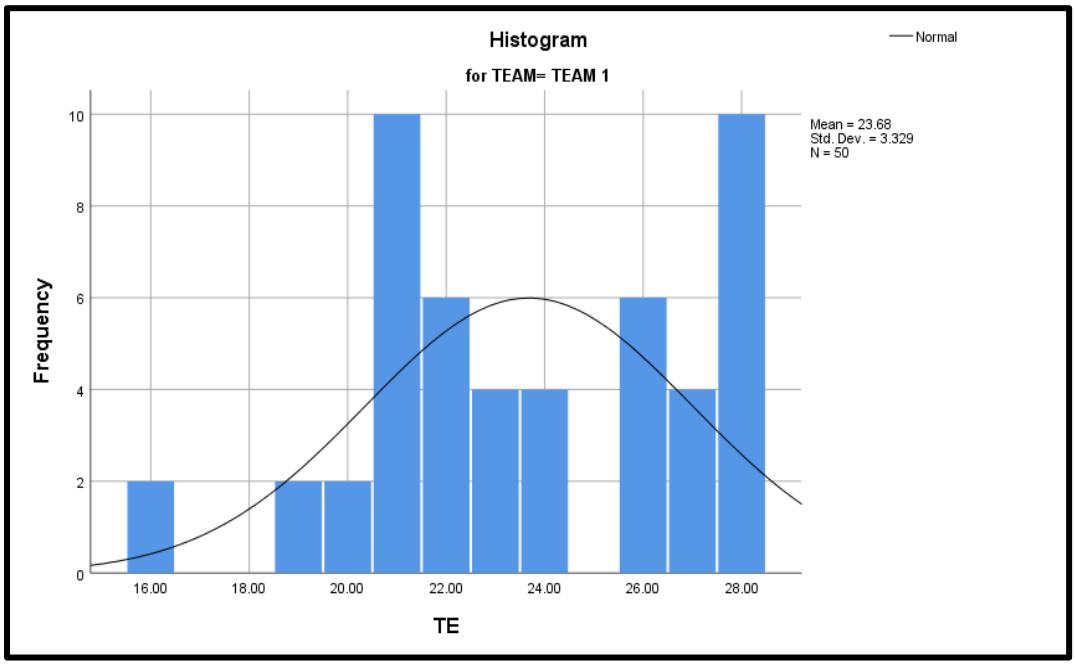
TEAM EFFICACY

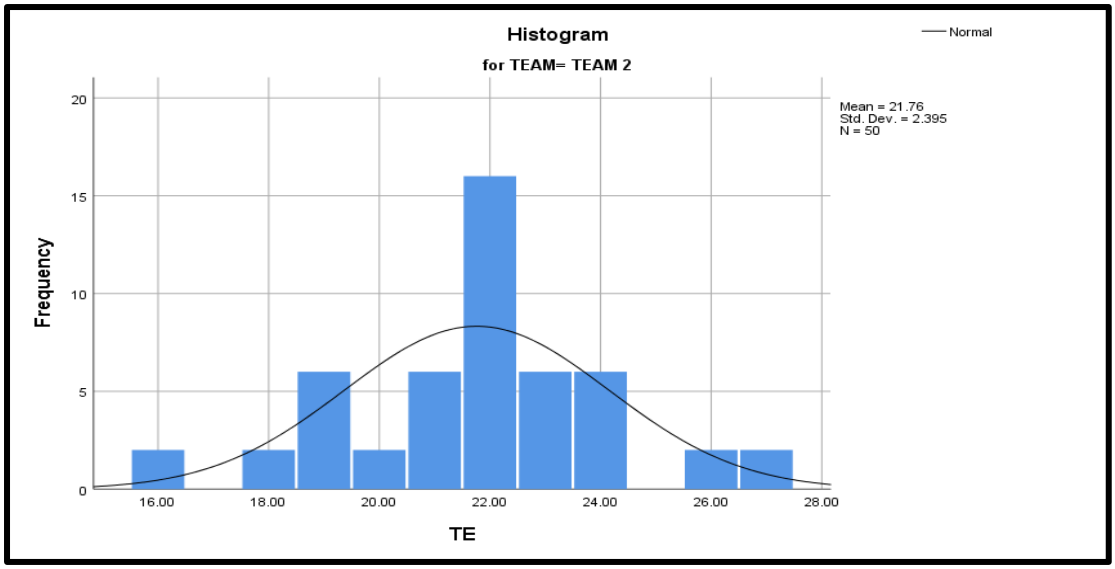
H0: Sampling is normally distributed for Team Learning Behavior with respect to Team 1 and Team 2.

H1: Sampling is not normally distributed for Team Learning Behavior with respect to Team1 and Team 2

	TEAM	Shapiro-Wilk		
		Statistic	df	Sig.
TE	TEAM 1	.915	50	.002
	TEAM 2	.951	50	.038

Table -3 Shapiro-Wilk Test for Team Efficacy





Graph-3 Normality Graph of Team Efficacy

From table no- The significance value of Psychological Safety with respect to Team 1 and Team 2 are 0.002 and 0.038 which are lesser than α = 0.05, Hence, we accept the alternate hypothesis for Team 1 and Team 2 that is the sample is not normally distributed for Team Efficacy.

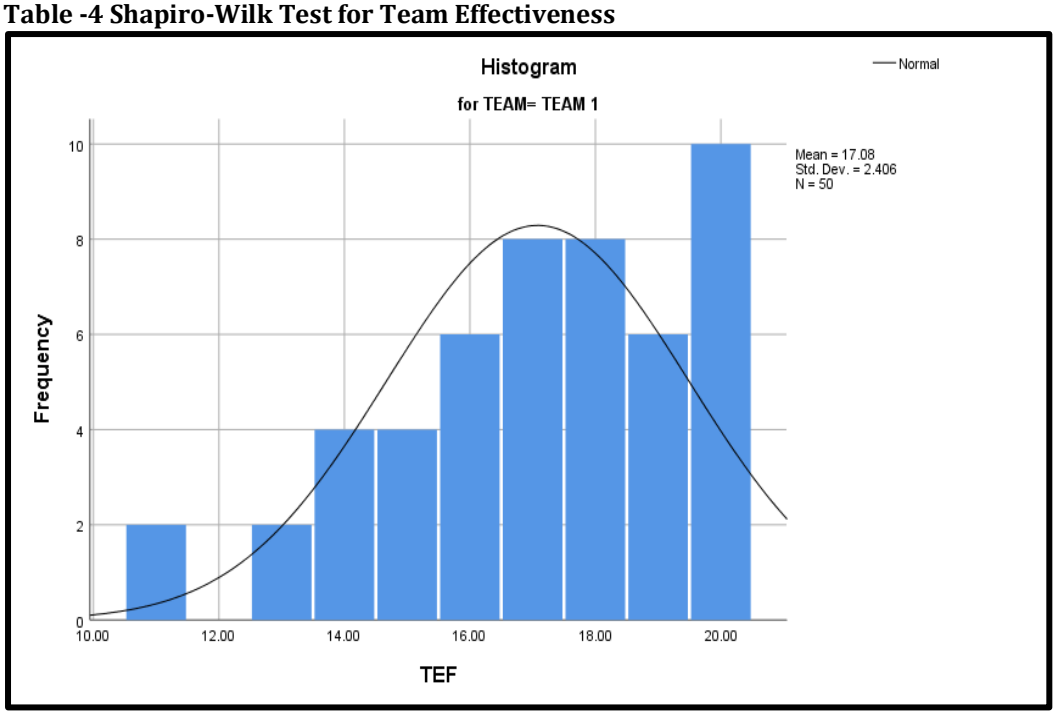
TEAM EFFECTIVENESS

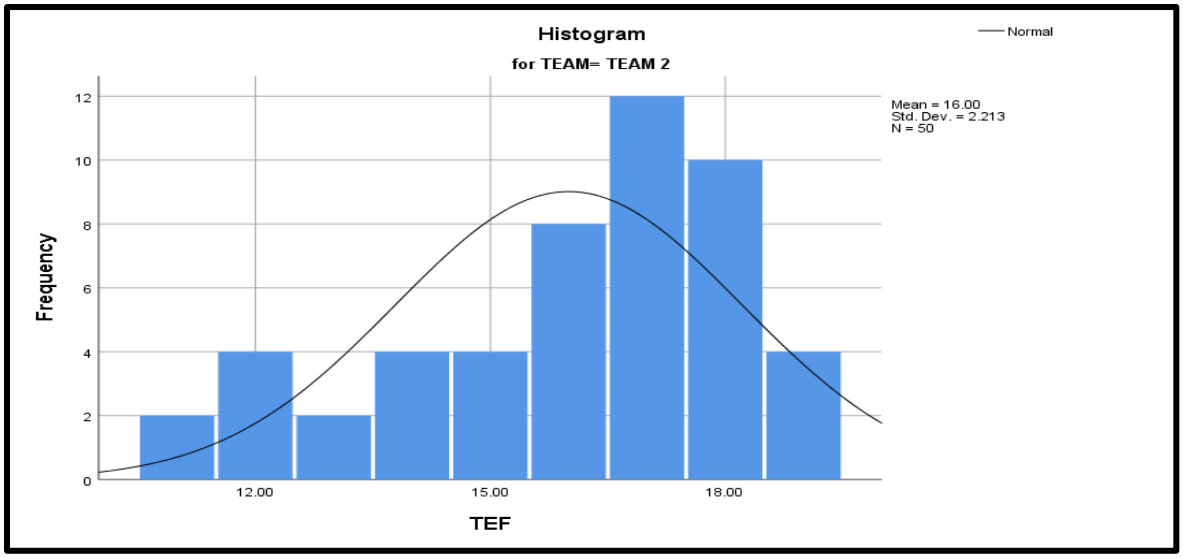
H0: Sampling is normally distributed for Team Learning Behavior with respect to Team 1 and Team 2.

H1: Sampling is not normally distributed for Team Learning Behavior with respect to Team1 and Team 2

	TEAM	Shapiro-Wilk		
		Statistic	df	Sig.
TEF	TEAM 1	.923	50	.003
	TEAM 2	.905	50	.001

Table -4 Shapiro-Wilk Test for Team Effectiveness





Graph-4 Normality Graph of Team Effectiveness

From table no- The significance value of Psychological Safety with respect to Team 1 and Team 2 are 0.003 and 0.001 which are lesser than α = 0.05, Hence, we accept the alternate hypothesis for Team 1 and Team 2 that is the sample is not normally distributed for Team Effectiveness

MEAN CALCULATION

	PS	LB	TEC	TEF
TEAM 1	3.35	3.35	3.38	3.41
TEAM 2	3.11	3.06	3.10	3.20

Table -5- Showing Analysis of Mean

From the above **table no-5**, it can be found that overall mean of Psychological Safety, Team Learning Behaviour, Team Efficacy and Team Effectiveness for the blue-collar employees is high in Team 1 when compared to Team 2.

MANN – WHITNEY TEST –

Analysis and results of Hypothesis 1,2,3 and 4

****Mann –Whitney test was applied to know the statistical significance between Team 1 and Team 2 as the data for all the four variables was not normally distributed.**

Sl. No	Particulars	U Value	P Value	Z Value	Hypothesis Accepted
1	Psychological Safety	806.00	.002	-3.079	AH
2	Team Learning Behaviour	618.00	.000	-.4.409	AH
3	Team Efficacy	858.00	.006	-2.728	AH
4	Team Effectiveness	912	.019	-2.353	AH

***AH-Alternative Hypothesis**

Table no -6 Showing Analysis of Mann-Whitney Test

From the above **table no-6** A set of 4 Hypotheses was set to test the different aspects of Psychological Safety, Team Learning Behavior, Team Efficacy and Team Effectiveness shown by Team 1 and Team 2 Applying Mann-Whitney it was found that with respect to all the four aspects i.e. the Alternative hypothesis was accepted, it was found that there was statistically significant difference between team 1 and team 2.

Effect Size:

The effect size can be used to describe the strength of the effect, with the following guidelines:
According to Cohen (1988)
Small effect: Effect size □ less than 0.3
Medium effect: Effect size □ between 0.3 and 0.5
Large effect: Effect size greater than 0.5
The effect size (r) is calculated as:

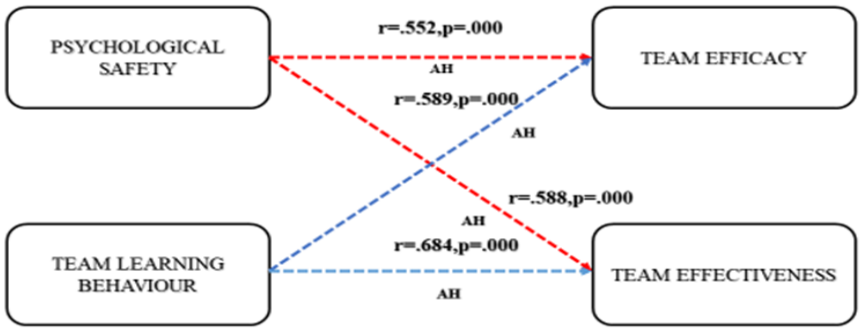
$r = Z / \sqrt{N}$

Sl. No	Particulars	r Value	Effect
1	Psychological Safety	0.3	Medium
2	Team Learning Behaviour	0.44	Medium
3	Team Efficacy	0.27	Small
4	Team Effectiveness	0.24	Small

Table no -7 Showing Analysis of Effect Size

From the above **table no.7** it can be seen that the effect size for Psychological Safety and Team learning behaviour is Medium (Cohen,1988) and for Team Efficacy and Team Effectiveness it is Small.

INTERCORRELATION ANALYSIS



Correlation between Psychological Safety with Team Efficacy and Team Effectiveness with reference to Hypothesis 5 and 6.

Correlations

			PS	TE	TEF
Spearman's rho	PS	Correlation Coefficient	1.000	.552**	.588**
		Sig. (2-tailed)	.	.000	.000
		N	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

Table no- 8 Showing Correlation of Psychological Safety with Team Efficacy and Team Effectiveness

From the above **table no-8** it can be seen that the p value of Psychological Safety and Team Efficacy is .000 and Psychological Safety and Team Effectiveness is .000 which is less than $\alpha = 0.05$, hence have the evidence to reject the Null Hypothesis therefore we accept the Alternate Hypothesis, hence it can be concluded that there is statistically significant positive correlation of Psychological Safety with Team Efficacy and Team Effectiveness.

The calculated Correlation Coefficient r is .552 and .558 showing moderate degree of positive correlation of Psychological Safety with Team Efficacy and Team Effectiveness (Evans, 1996)

Correlation between Team Learning Behavior with Team Efficacy and Team Effectiveness with reference to Hypothesis 7 and 8.

Correlations

			TLB	TE	TEF
Spearman's rho	TLB	Correlation Coefficient	1.000	.589**	.684**
		Sig. (2-tailed)	.	.000	.000
		N	100	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

Table No- 9 Showing Correlation of Team Learning Behaviour with Team Efficacy and Team Effectiveness

From the above table no- it can be seen that the p value of Team Learning Behaviour and Team Efficacy is .000 and Team Learning Behaviour and Team Effectiveness is .000 which is less than $\alpha = 0.05$, hence have the evidence to reject the Null Hypothesis therefore we accept the Alternate Hypothesis, hence it can be concluded that there is statistically significant positive correlation of Team Learning Behaviour with Team Efficacy and Team Effectiveness.

The calculated Correlation Coefficient r is .589 and .684 showing moderate degree of positive correlation of Team Learning Behaviour with Team Efficacy and strong degree of correlation between Team Learning Behaviour and Team Effectiveness respectively (Evans, 1996).

CONCLUSION

Team plays a very crucial role in today's organization. Developing an organization with well performing teams can be challenging as various factors affect an individual in a team. Some of the factors effecting teams can be Psychological Safety and learning behavior which effects the team's efficacy and effectiveness. According to the overall mean findings, it was found that, Psychological Safety, Learning Behavior, Team Efficacy and Team Effectiveness is high in Team 1 employees than Team 2 employee

The results from the survey with respect to find the statistical difference in perception between team 1 and team 2 for Psychological Safety, Team Learning Behaviour, Team Efficacy and Team Effectiveness the alternative hypothesis was accepted that is there was statistical significant difference between team 1 and team 2 for all the four variables taken for the study.

Intercorrelation were calculated to find the correlation and it was found that there was moderate degree of correlation of Psychological Safety with respect to Team Efficacy and Team Effectiveness and for Team Learning Behaviour and Team Efficacy there was moderate degree of correlation and with Team Effectiveness there was high degree of correlation.

The study concludes that Team efficacy and Team effectiveness depend on Psychological Safety and Learning Behavior in the team.

SCOPE FOR FUTURE RESEARCH

The scope for future research is to study the productivity of teams with due consideration to all the four variables. Future researchers could explore the role of Psychological Safety in team development. The future studies may attempt to investigate the determinants of higher influence of Psychological Safety among team members. The studies could also examine how team development affects organizational development. Future studies could also consider various other variables affecting the team performance. As this study was conducted for a manufacturing unit, future studies could be undertaken for IT Sector.

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