A Study of the Effect of the Myers-Briggs Type Indicator on Team Effectiveness

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Abstract

Competitiveness in the business world has led to a great need for increased productivity. One way that companies, as well as academic institutions, have tried to meet this need is by using teams. However, many of the promised gains of using teams have not yet been fulfilled. This research sought to find a way to make teams more effective by considering and utilizing each team member's psychological type information.

Specifically, students in engineering senior design classes were given the Myers-Briggs Type Indicator Test (MBTI) in the first week of their teaming experience. Half of the students then received the Myers-Briggs psychological type training. The training discusses various strengths and weaknesses of each type, as well as how each type might function in a teaming environment. At the end of the semester, team effectiveness was rated in two ways. The first measure was the grade the team received in their senior design class, while the second measure involved the Team Effectiveness Questionnaire (TEQ). The TEQ allows a team to rate its own effectiveness by answering a number of questions regarding different team related issues.

This research study sought to test whether psychological type training had an effect on the effectiveness of a team.

Introduction

A team in the workforce is often formed according to the technical knowledge of its members. Little is known, however, regarding the non-technical factors that determine team performance above and beyond individual competency[1]. When a team fails, "problems are often blamed on 'poor communications,' an overly broad label for a range of personality differences that can create tensions and misunderstandings[2]." Most managers agree that people rarely fail due to a lack of knowledge, skills, or intelligence, but invariably fail because they are unsuitable in terms of temperament and motivation[3].

The recent proliferation of teams in the work environment has led researchers to examine the relationships between various team characteristics and different measures of effectiveness. The goal of many researchers in this area is to develop recommendations for the design of work teams to enhance the likelihood that they will be effective[4]. Unfortunately, there has been little

research evaluating selection and placement strategies to enhance team process and performance, especially for variables such as personality[5]. Despite the scarcity of research specifically related to work-team staffing, research in group dynamics may provide a basis for making predictions of how personality preferences are likely to contribute to work-team effectiveness[6]. Shaw suggests that the individual characteristics of group members, as well as the diversity of skills and traits within a group, are important factors related to group effectiveness[7].

A positive view of individual differences is important as many companies transition from a traditional hierarchical organizational structure, with little employee interaction, to self managed work teams with constant interaction. Today, managers must help their employees understand each other better and realize that someone who is different than themselves is not in any way less valuable. A useful tool to help people further understand themselves and others is the Myers-Briggs Type Indicator test.

The Myers-Briggs type indicator test was designed by Isabel Myers-Briggs and Katherine Briggs in the 1920's. The test is based on Carl Jung's psychological types. The general aim of type theory involves self, others, and self-development. The first aim of type theory is "to provide an economical summary of central aspects of personality, one which increases self-understanding and implies certain ways of behaving more than others[8]." The second aim is to help individuals value those people who are of a different type. The third aim of type theory is to encourage people to value their type and to highlight areas of personal development.

The test measures four different dimensions of human preferences through a self-evaluating questionnaire that can usually be completed in 15-20 minutes. The first dimension is extraversion vs. introversion, indicating whether a person gets their energy from the outside world of people (preference for extraversion) or from the inside world of thoughts and ideas (preference of introversion). The second dimension is sensing vs. intuition, representing whether a person prefers the details of a situation (sensing preference) or the overall picture of an experience (intuition preference). The third preference dimension, thinking vs. feeling, indicates the way people make their decisions. People with a thinking type preference tend to make their decisions based on logic, facts and fairness, while feeling types tend to focus on the effect that their decisions will have on the people involved. The last preference dimension addresses the way that people prefer to organize their world. People who have a judging preference are organized, punctual, and like to plan ahead, while people with a perceiving preference are usually spontaneous, adaptable, and open to new ideas[9].

The most important concept of this type of information is that there is no right or wrong preference. According to the theory, all eight preference poles included in the MBTI are used by every person at one time or another[10]. The value of the test is derived by learning more about yourself and others and being better able to understand the behavior of someone who has a different type preference.

The use of the Myers-Briggs test in a team setting can help to overcome team performance obstacles by encouraging team members to better understand each other. According to Culp & Smith, understanding individual preferences can "identify potential blind spots or areas of vulnerability on a project team", "demonstrate the value of having diverse styles on the

team," and "reduce stress levels by helping the team understand which situations will energize an individual and which will stress an individual[2]."

Generally when the MBTI is used with a group of people in a teaming environment, the MBTI questionnaire is administered to each member individually, and then as a team "they are led through exercises and explanations that impress upon them how the panoply of psychological types on the team can be both a barrier and an asset to working together effectively[11]." According to Coe, the MBTI has been shown to improve personnel management in the following ways: identifying leadership styles, training employees to work better with each other, resolving employee conflicts, and forming work teams that best complement each other[12].

One reason that personality preferences are so important is demonstrated in the following statement. A neglected assumption of personality psychology is that personality influences other people[13]. Because of the influence that one's personality has on others, it is an especially important area of study. Group members can have a significant affect on each other. This dynamic view of personality can help to account for some apparent inconsistencies in personality. A sociable individual might behave more sociably around an extrovert than an introvert. This waxing and waning of conduct, rather than indicating an inconsistency in personality, indicates the importance of personality and the necessity of taking another's disposition into account[13].

The 2001-2002 Criteria for Accrediting Engineering Programs states that program outcomes for engineering graduates must include "an ability to function on multi-disciplinary teams[14]." Yet students and employers alike are finding that there is a gap between the team skills learned in education and the skills needed in today's changing work place. The American Society of Engineering Educators (ASEE) has also recognized the need for change in the current engineering curriculum. It is believed that creating more effective team experiences for students and faculty members will promote team-oriented learning. It is further believed that positive teaming experiences in the educational system will help students become comfortable and confident in self-directed teaming situations within the work place.

In order to measure team effectiveness, researchers at the University of Nebraska have developed the Team Effectiveness Questionnaire (TEQ). The TEQ utilizes seven characteristics including Productive Conflict Resolution, Mature Communication, Role Clarity, Accountable Interdependence, Goal Clarification, Common Purpose, and Psychological Safety as a means to measure the effectiveness of teams[18]. It is believed that many of the team characteristics tested in the TEQ could be improved by increased team based psychological type training. Brief definitions of each of these seven constructs are provided.

Common purpose is the main objective of the team and should be understood and shared by all team members. Common purpose should lead to the development of the team's goals. Successful teams shape their purposes in response to a demand or opportunity put in their path[19]. This helps teams to begin by broadly framing the convener's expectation.

Clearly defined goals are quantifiable and commonly agreed upon statements that define the actions to be taken by the team. The attainment of specific goals helps teams maintain their focus.

Psychological safety is the shared belief that the team is safe for interpersonal risk taking[20]. Psychological safety leads to a team climate characterized by interpersonal trust and mutual respect in which people are comfortable being themselves. Psychological safety is a sense of confidence that the team will not embarrass, reject or punish someone when speaking.

Role clarity is the team members' common understanding of each individuals expected role. The presence of role clarity minimizes misunderstandings regarding task assignments.

Mature communication refers to team members' ability to:

1. articulate ideas clearly and concisely
2. give compelling reasons for their ideas
3. listen without interrupting
4. clarify what others have said
5. provide constructive feedback

Mature communication among team members ensures a higher level of understanding.

Productive conflict resolution refers to the procedures and actions taken when a conflict occurs that lead to results such as:

1. facilitating the solution of the problem
2. increasing the cohesiveness among team members
3. exploring alternative positions
4. increasing the involvement of everyone affected by the conflict
5. enhancing the decision-making process[21]

Accountable interdependence is the mutual dependence that all team members have regarding the quality and quantity of each individual's work within the team. Mutual dependence generates a shared sense of security.

These seven constructs were identified from the literature review and the work of leading theorists and practitioners in industry and academia, along with the personal experiences of the research team as contributors to high performing teams. Furthermore, these constructs can be applied to a wide variety of teams and can be measured by asking team members for their attitudes, opinions, and perceptions.

The TEQ is divided into two main parts. The first part is used to collect demographic data and information on individual preferences regarding teaming and previous team experiences. The second part of the questionnaire is used to measure the student's ability to effectively work in teams and to measure their understanding of each of the characteristics identified by the researchers as vital for the performance of the team. Between five and nine questions were included in each of the categories.

The team effectiveness questionnaire was constructed using both nominal scales and interval scales. Nominal scales are used in the first part of the questionnaire to collect

demographic information and some of the student preferences towards teaming. A five-point Likert scale ranging from "Strongly Agree" (1), to "Strongly Disagree" (5) was used as the interval scale for the second part of the questionnaire. Interval scales are used for most questionnaires for several reasons: variables measured in interval scales can be analyzed using parametric statistics that are based on the assumption that the scores represent a normal distribution around the population mean, and these scales also provide the most variation of responses lending themselves to better data analysis.

Normally, a self-directed work team is a highly trained group of employees who are fully responsible for turning out a well-defined segment of finished work[15]. According to Orsburn, Moran, Musselwhite, Zenger, and Perrin, "better results, more satisfied customers, more committed people, innovative and flexible responses to changes from outside, and breakthrough improvements initiated at all levels" are often the outcomes of the use of self-directed teams in the workplace[15]. According to Manz and Sims, "increased productivity, improved quality, enhanced employee quality of work life, reduced costs, reduced turnover and absenteeism, reduced conflict, increased innovation, and better organizational adaptability and flexibility" are all benefits of using teams[16].

Teamwork should be included in the curriculum because of these benefits. Yet though most engineering degree programs frequently use teams, the training and evaluation of these methods has, in many cases, been non-existent. Therefore, the objective of this research was to test whether increasing knowledge of one's self and others will help individuals to become more effective in teaming environments.

Methodology and Analysis

The participants in this experiment were senior design students at the University of Nebraska College of Engineering and Technology in the spring semester of 2002. According to Fowler, capstone design courses are the best stage in the curriculum to introduce teams because they minimize the student's dependence on the professor and prepare students for the real world experience[17]. A total of 200 students were enrolled in the senior design classes that were analyzed. Eighty-four percent of the participants were male and 16% female. Sixty-five percent of the students were between 22 and 24 years old and 40% had spent between four and five years in college. Forty percent of the class participants had a GPA between 3.0 and 3.5 and 32% had a GPA greater than 3.5. Approximately 90% of the participants in the sample were White/Caucasian.

The departments that participated in the research were as follows: Agricultural and Biological Systems Engineering, Chemical Engineering, Computer Engineering, Construction Management, Electrical Engineering, Industrial Engineering, and Mechanical Engineering. Three of the disciplines listed above (Agricultural & Biological Systems, Electrical, and Mechanical Engineering) have senior design projects that extend across two semesters. Both the first semester and second semester classes participated in the research.

The teams used in these engineering senior design classes perform many of the same tasks as self-managed teams in the workplace. Once assigned a project, they were responsible for

all aspects of its completion. The professor was available when needed to facilitate communication with an outside company or to help procure additional resources, but the team alone was responsible for the quality of their project. Therefore, it was assumed that the senior design teams qualified as self-managed teams.

Data was collected from the senior design students at two points during the semester. During the first two weeks of class, the students filled out the Myers-Briggs Type Indicator questionnaire. During the last three weeks of the semester, the students completed the Team Effectiveness Questionnaire (TEQ) in class.

In completing the MBTI, students were given the instructional booklet, the answer sheet, and a sheet that briefly explained what the Myers-Briggs was not measuring. This sheet was included to reinforce the idea that individual answers are not right or wrong. After a MBTI certified facilitator scored the tests, approximately half of the students were given the standard required training that accompanies the application of the MBTI. The training lasted about one hour and was given approximately one month into the study. The training included an explanation of the different type preferences, how people with a given type preference are likely to react to a certain situation, aggravations of opposite type preferences, and the strengths and weaknesses that each type preference brings to the teaming environment.

Though it would have been best to give the training to half of each class, this was deemed infeasible because of the limited time schedules of the classes involved. Instead, the certified professional trained the students in three of the classes. There were 95 students in the three trained classes, approximately one half of our total sample size. The remaining students were then part of the control group. The students in the control group received the training session on the same day they completed the team performance questionnaire.

The performance of the senior design students was measured in two different ways. One measure was the grades that the teams received in their senior design classes. The second measure of performance was generated from the responses to the TEQ questions that dealt specifically with performance. The average level of performance was obtained by averaging all of the team member's answers to the performance related questions. From now on the performance measure, the attitude measure, and the measures of Productive Conflict Resolution, Mature Communication, Accountable Interdependence, and Psychological Safety obtained from the TEQ are referred to collectively as the TEQ measures.

The objective of this study was to test whether team members perform better when given the Myers-Briggs test and then educated with the required information on psychological type in a brief training session. This effect was measured by comparing the performance of the group that received MBTI training to the performance of a control group, or the students who completed the Myers-Briggs test but were not educated with a training session.

Results

A total of 193 senior design students completed the Myers-Briggs Type Indicator test. The average subject exhibited the introversion, sensing, thinking, and judging preferences

(ISTJ). This is not surprising because these four preferences types are found to be the most common for individuals in the engineering profession[2]. Because five students did not complete the class, a total of 188 students completed the Team Effectiveness Questionnaire.

Analysis of variance (ANOVA) was used to compare the TEQ measures for students that had the Myers-Briggs training session with those that did not. ANOVA is a hypothesis-testing procedure that is used to evaluate the significance of mean differences between two or more populations. Table 1 provides the ANOVA results.

Table 1. ANOVA on Team Type Training for the TEQ Measures

		Sum of Squares	df	Mean Square	F	Sig.
Performance	Between Groups	1.252	1	1.252	4.263	0.043
	Within Groups	17.324	59	0.294		
	Total	18.576	60			
Conflict	Between Groups	0.283	1	0.283	1.583	0.213
	Within Groups	10.544	59	0.179		
	Total	10.826	60			
Communication	Between Groups	0.587	1	0.587	4.452	0.039
	Within Groups	7.776	59	0.132		
	Total	8.363	60			
Interdependence	Between Groups	1.987	1	1.987	7.854	0.007
	Within Groups	14.925	59	0.253		
	Total	16.912	60			
Psych Safety	Between Groups	0.887	1	0.887	5.100	0.028
	Within Groups	10.266	59	0.174		
	Total	11.153	60			
Attitude	Between Groups	1.819	1	1.819	11.323	0.001
	Within Groups	9.481	59	0.161		
	Total	11.300	60			

All values in the table are significant at p=.05. The ANOVA for performance was significant with F=4.263, p=.043. The ANOVA for conflict was not significant with F=1.583, p=.213. The ANOVA for communication was significant with F=4.452, p=.039. The ANOVA for interdependence was significant with F=7.854, p=.007. The ANOVA for attitude was significant with F=11.323, p=.001. The ANOVA for psychological safety was significant with F=5.100, p=.028. These results reinforce the value of team training. Even a short training session significantly increased the levels of mature communication, psychological safety, and interdependence in the student teams. The training also significantly affected the overall attitude felt by the team members.

Conclusions

The most significant conclusion that can be drawn from this research is that team training on psychological type can have a significant affect on team effectiveness and performance. This type of training seems to be more significant than other training sessions of similar lengths that

are focused on a specific task. This seems to be true because of the validity that people see in the type information and the daily application of that information.

Based on this research it seems clear that team based psychological type training can greatly increase the effectiveness of teams. Particularly, this research found that team training associated with the Myers-Briggs test was very helpful. Therefore, in order to increase the effectiveness of teams in engineering education, the teams should be provided with information on psychological type to help members understand each other better. If individuals begin to see the benefits rather than the limitations of working on a team, then the full potential of using teamwork in organizations can be tapped and the productivity gain that many experts predicted from using teams may be realized.

This research did not conclude that there is a particular combination of team preferences that perform better. This does not mean that the type preferences of team members will not affect the way the team makes decisions and behaves. It does mean that a deeper understanding of each team member's preferences can help the other team members to understand each other. It can work to eliminate the idea that the other person is the way they are simply to aggravate another team member. Tolerance and understanding of another individual's behaviors and actions are the largest benefits that the Myers-Briggs test has to offer to teams.

In conclusion, the MBTI and its associated psychological type training are very powerful tools that can be used to increase the effectiveness of teams. The psychological type profiles of the team alone cannot predict the level of a team's performance or effectiveness. The greatest gift that the MBTI gives individuals is the increased understanding of both themselves and others.

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