

The Influence of Organizational Factors on Design Employees' Innovation Ability: The Mediating Role of Team Learning

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Abstract: *Innovative design has promoted the improvement of the design ability of the manufacturing industry, realized the transformation of design itself from concept to method, and promoted the progress of the training mode of design talents. However, the core problem that currently restricts the continuous improvement of China's manufacturing design capabilities lies in the shortage of design talents. At present, due to the rigidity of the organizational structure, the defects of the organizational system, the insufficient stock of organizational knowledge, the inertia of the organization, and the weak organizational culture, etc., the innovation ability of the employees of the enterprise is seriously affected. How to improve behaviour, optimize team system, and enhance organizational adaptability to achieve innovation goals on the basis of team learning has become a problem that enterprise managers must seriously consider.*

Keywords: *team learning; organizational learning; innovation ability; team performance*

1. Introduction

In recent years, with the development of the knowledge economy, organizations need to continuously strive to change or redesign themselves to adapt to the continuously changing internal and external environment in order to adapt to the intensification of global competition. The organization's ability to adapt to environmental changes mainly depends on the organization's acquisition, development, utilization and innovation of external information and knowledge, that is, the organization's learning ability. As the basis of organizational learning, team learning (team learning) plays a role in improving organizational learning capabilities, exerting organizational effectiveness, and responding to changing environments. It has a unique role and has attracted more and more attention from the theoretical and practical circles. At the same time, as the most basic work unit in the organization, the team is the most critical learning unit in the organization. The effectiveness of team learning also affects the innovation performance of the organization to a large extent. Therefore, how organizations can promote team learning, increase team learning behaviors, and improve team learning effectiveness, so that the organization can gain long-term competitive advantages, has become an important issue facing organizational human resource management.

2. Team learning concept connotation and nature

2.1 The main connotation of team learning

Team learning (team learning is also called group learning) or team-based learning (team based on learning), its concept can be traced back to Senge's book "The Fifth Discipline - The Art and Practice of the Learning Organization" fifth discipline: The art and practice of the learning). In this work, team learning is proposed as one of the five disciplines to create a learning organization. Senge believes that the team is the basic unit of organizational learning. Team learning is the most important form of organizational learning. It is also the process of developing the overall coordination and ability of group members to achieve common goals^[1]. Only by continuous learning and innovation can enterprises survive in a complex and ever-changing environment. In psychology, learning refers to the process in which an individual acquires new knowledge and abilities beyond the boundaries of existing knowledge and abilities. Learning is a basic research field in organizational behavior. Although it is

limited to cognitive processes in terms of content, in fact, all levels and modules of organizational behavior, ranging from the acquisition of individual knowledge to organizational change and development, are inseparable from the learning process. The subject of learning can be people, teams and organizations. Learning can not only occur at the three levels of individuals, teams and organizations, but also across levels. For organizations, individual learning is the foundation, but team learning is the key. Without individual learning, there would be no team learning, let alone organizational learning. Therefore, team learning plays a connecting role in individual learning and organizational learning.

2.2 Team learning and work performance

Knowledge creation and knowledge transfer are important resources for enterprises to maintain their competitive advantage. Today, given that many teams face complex changes and uncertainties, teams must learn in order to better understand the environment they face and their customers, and in order to effectively coordinate members' actions. Edmondson once pioneered the team learning model, as shown in Figure 1. Team learning is a basic unit of organizational learning. Through learning, teams can make relatively lasting changes in the knowledge and skills at the team level (which are generated from the sharing of knowledge among team members). In this way, the team can better adapt to changes in the environment, improve team work and solve new problems, and ultimately lead to a good performance^[2]. In addition, according to the "shared mental model" theoretical research, fully sharing team members' work-related understanding (as a part of teamwork) can indeed make the team run better. Argote team learning related to work processing can affect the coordination of many activities, thereby affecting performance, and believes that effective team learning is conducive to the production of high performance. Although over the past few decades, some practitioners, such as practitioners, have argued for the importance of team learning to organizational effectiveness (including, team performance, etc.). But empirical research has just begun to examine the relationship between team learning and team performance. An empirical study has shown that learning behavior in teams has a positive relationship with team performance, that is, team learning helps enhance team performance.

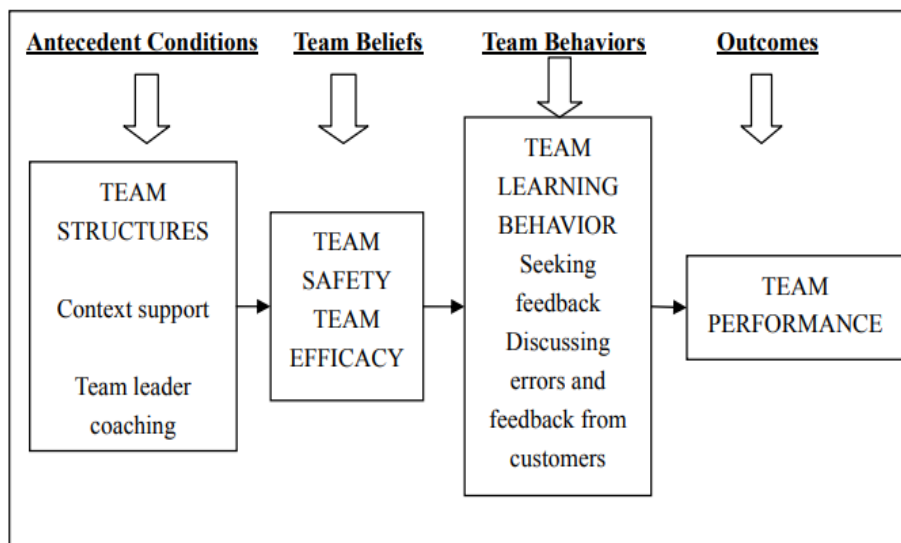


Figure 1: Team Learning Model (Edmondson, 1999)

3. Organizational constraints on current enterprise innovation capabilities

3.1 Organizational structure innovation lags behind

The innovation capabilities of enterprises require flexible and flexible flat organizations, virtual organizations, and networked organizational structures. However, most enterprises in our country still remain in the linear functional system and matrix structure^[3]. The China Entrepreneur Survey System pointed out in "Enterprise Innovation: Current Issues and Countermeasures - Special Report on the Growth and Development of Chinese Enterprise Operators" that "currently more than half (54.3%) of enterprises adopt the 'line function system' in their organizational form., another 24.8% of companies

adopt the 'parent-subsidiary system', and a few companies adopt new organizational forms such as the 'division system', 'matrix system' and 'multi-dimensional system' ... There are still about 26 % of companies. There is no change in the organizational structure ... reflecting that the overall level of innovation in the current corporate organizational form is still relatively lagging."

3.2 Insufficient organizational knowledge stock

Enterprise innovation is not the innovation of personal knowledge, but requires sufficient organizational knowledge stock. The knowledge stock of the organization is reflected in the experience and experience of the enterprise, and this experience and experience have a positive relationship with time. Enterprises under the planned economic system carry out production according to the government's plan, do not have management autonomy and are not market players. At this stage, they have almost no market experience and experience to speak of. Even if there is, as analyzed above, it is an experience of abnormal development and has become an important factor hindering corporate organizational innovation^[4]. After the reform and opening up, Chinese enterprises have developed through exploration. However, since the whole society of our country is in a period of transformation and there is no perfect market system, enterprises must constantly adjust themselves to keep in line with the transformation of the society. Experience becomes elusive and erratic in the face of too many chances. Because the development history of modern enterprises in the true sense is too short, a complete set of organizational management theories applicable to Chinese enterprises has not been formed in our country to guide the innovation and development of local enterprise organizations. There is a serious shortage of organizational knowledge in Chinese enterprises.

3.3 Organizational inertia limits the innovation ability of enterprises

According to Edison's corporate life cycle theory, after a company reaches middle age, its controllability becomes stronger, but its flexibility decreases. Especially for those successful enterprises that have developed to the peak, its organizational members, especially the leadership of the enterprise, are often addicted to the joy of success, and have strong emotions for the successful operation mode and organizational norms in the initial stage of entrepreneurship. Under certain fairly common conditions, it can make a business obsessed with past successes, and when markets and technologies change, it can have catastrophic consequences. It is generally believed that organizational inertia is divided into organizational structural inertia and organizational cultural inertia. Once cultural inertia is formed, the once informal norms, values, and group consciousness in the organization will become deeply embedded in the daily behaviors of organizational members. The formation of cultural inertia makes innovation in organizational structures more difficult and costly.

4. The Impact of Team Learning on Member Development

Learning is a relatively permanent change in behavior that occurs as a result of experience with other people or the environment. The learning of any behavior is to obtain reinforcements and rewards to satisfy the individual's inner needs. Individual actors learn not only through direct experience, but also through observing or listening to events and experiences that happen to others. Team learning is the collective learning of a unit, which facilitates mutual learning, mutual communication, mutual inspiration and common progress among unit members. Team learning is a process in which group members cooperate and achieve common goals. Team learning is a win-win situation for both organizations and individuals. Team learning can have the following impacts on the individual development of members:

4.1 Master communication skills

During the team learning process, members need to share knowledge and experience with others. Due to differences in individual personalities, habits, and temperament types, one should first understand others' temperament types, communication styles, etc. In the working relationship, we should adhere to the concept of unity within division and division within unity. We should maintain a high degree of autonomy, flexibility, own personality and habits, and have a high degree of cooperation. See your own strengths and weaknesses, and learn from the strengths of others.

4.2 Improve cognitive level

Through team learning, members can share knowledge and build a unique shared mental model (SMM) belonging to the team during the learning process. Understand the knowledge, skills and abilities of teammates, make correct evaluations of them, make judgments about your own expectations and influence your own behavior. The sharing of knowledge does not lie in what you know, but with whom you know; it does not depend on who influences you, but who you influence^[5]. Team members can only achieve knowledge sharing through knowledge sharing, mutual communication and learning. Through knowledge sharing, members can improve their own cognitive level, learn new knowledge and integrate it with their own knowledge. In addition, they can also get feedback from the sharing objects during the sharing process.

4.3 Improve personal quality and self-cultivation

In the process of team learning, members obtain new information through sharing knowledge, continuously learn and understand new situations, and master new skills. Efforts should be made to broaden the areas of study and practice, so that one can accumulate knowledge, skills and abilities suitable for various aspects of work adhere to the principle of applying what one has learned, and transform the knowledge learned into practical abilities and apply them to work. In the process of learning, they can emancipate their minds, update their concepts and broaden their thinking, and analyze, judge and deal with problems from a new perspective. Give full play to personal value in the workplace, improve one's own quality through the accumulation of knowledge, realize personal value, and improve self-cultivation.

4.4 Enhance one's psychological flexibility

Individuals with a high level of psychological flexibility indicate that their comprehensive qualities in terms of cognition, tolerance intensity, emotional activation, stress style, and personality traits have reached the best match for the external environment, and they can respond in the most effective manner. The way is externalized. Therefore, in a certain sense, the process of individual psychological emergence and development is the process of continuous enhancement of psychological flexibility, and the process of increasing and perfecting the level of socialization and social adaptation. Psychological resilience should be regarded as a core variable in the structure of individual quality, and it is also a comprehensive manifestation of individual personality and cognitive level. Through team learning, not only will the knowledge from within the team be obtained, but also the ability to resist external risks will be increased. It changes with the change of the environment, and achieves dynamic regulation and adaptation to the environment during the change, and enhances its own elasticity and psychological endurance^[6]. Due to the existence of individual differences, everyone can discover their own comparative advantages. Team learning can effectively play the comparative advantages of individual members to achieve mutual assistance within the team. At the same time, through team learning, team wisdom can be integrated into personal concepts to continuously adapt to work needs in new situations. You can share other people's work skills and effective methods, and you can also demonstrate personal understanding and unique ideas, and accept inspiration from others. The team learning process can well promote personal growth.

5. Team Learning

5.1 Data collection

The questionnaires in this article were distributed mainly in Zhejiang, such as Hangzhou, Jiaxing and other places. The object of the questionnaire survey is the working team of the design department in the manufacturing enterprise. A total of 500 questionnaires were printed and sent out, and 435 questionnaires were returned, with a total of 74 teams, each with between 3 and 15 people. During the questionnaire sorting and data entry stage, questionnaires with missing data and those that could not be matched were eliminated. The final number of valid questionnaires was 345, including 65 captains and 280 members, a total of 65 teams, and the effective questionnaire recovery rate was 87.83 %.

5.2 Measurement results

Demographic variables that have an impact on team creativity are added, followed by team learning goal orientation. The results are summarized in Table 1.

Table 1: Statistical table of the regression model of team learning goal orientation on team creativity

| Model | R | R2 | adjust R2 | F | Sig |
|-------|-------|------|-----------|-------|------|
| 1 | .259a | .067 | .021 | 1.467 | .232 |
| 2 | .507b | .257 | .207 | 5.177 | .000 |

a. Predictor variables: (constant), length of service, education, age.

b. Predictor variables: (constant), length of service, education, age, team learning goal orientation.

Based on the analysis in the above table, it can be seen that the explained variation has increased from 6.7% to 25.7%, which means the regression equation has increased the explanation of team creativity; and compared with Model 1, the explanation of Model 2 has been significantly improved, and the amount of change has been significant.

Table 2: Regression analysis table of team learning goal orientation on team creativity

| Model | | Un-standardized Coefficient | | standardized regression coefficient | t | Sig. | Co-linearity Judgment | |
|-------|----------------------------|-----------------------------|----------------|-------------------------------------|--------|------|-----------------------|-------|
| | | B | standard error | | | | Tolerance | VIF |
| 1 | (constant) | .001 | .123 | | .010 | .992 | | |
| | Educational qualifications | -.153 | .148 | -.155 | -1.034 | .305 | .676 | 1.478 |
| | age | -.016 | .249 | -.016 | -.065 | .949 | .235 | 4.249 |
| | length of service | -.252 | .224 | -.257 | -1.124 | .265 | .292 | 3.430 |
| 2 | (constant) | -.007 | .111 | | -.063 | .950 | | |
| | Educational qualifications | -.245 | .135 | -.249 | -1.815 | .075 | .656 | 1.525 |
| | age | -.259 | .233 | -.265 | -1.114 | .270 | .219 | 4.575 |
| | Seniority | -.013 | .211 | -.013 | -.061 | .952 | .267 | 3.745 |
| | team learning goals | .457 | .117 | .457 | 3.909 | .000 | .905 | 1.105 |

c. Dependent variable: team creativity

Table 2 shows the regression analysis results of team learning goal orientation on team creativity. First, education, age and length of service are included as control variables in the equation. Then team learning goal orientation was added, and the results showed that team learning goal orientation had a very significant effect on team creativity ($\beta=0.457$, $p<0.01$). At the same time, since the VIFs are all less than 10, there is no multicollinearity problem in the regression model.

5.3 Experimental results

This study hypothesizes that team learning goal orientation has a positive impact on team creativity, which is supported by empirical analysis and is the same as the conclusion of previous related studies. Team learning goal orientation is the common cognition that team members tend to learn, focusing on acquiring and updating knowledge at work. Team members have exceeded the requirements of the task itself, but are devoted to creative activities from the heart, motivating team members to information Collect and exchange, value the development of one's own abilities, prefer things that challenge, and will actively propose new methods to implement, thereby improving team creativity; team members with a team learning goal orientation try to overcome difficulties encountered in the process, and can pursue persistent pursuits even if they fail Effective coping strategies and creative completion of tasks. Therefore, team learning goal orientation plays a positive role in team creativity.

6. Manufacturing Design Capability Improvement Path

6.1 Product design needs manufacturing enterprises

Conduct detailed research and on-site inspections around manufacturing enterprises to understand

the inherent laws and product design and development models of the development of different manufacturing enterprises; deeply explore the essential needs for improving the design capabilities of manufacturing enterprises, and integrate market demand, user needs, usage needs, etc., Combined with the actual situation of the enterprise, convert it into a standard design requirement, and provide technical support for the later docking of product design talents. In addition, the exploration of design needs is conducive to integrating the superior resources of the manufacturing industry, promoting the formation of industrial clusters in the region, and realizing the optimal allocation of resources, thereby enhancing the overall competitiveness of the manufacturing industry, helping companies find new selling points and open new markets.

6.2 Adjustment of manufacturing design talent structure

Talent is the root of scientific and technological progress and the primary competitiveness of enterprises. Therefore, enterprises should not only make good use of existing talent resources, but also continuously strengthen the depth of integration of production and education, build a school-enterprise cooperation project model, strive to build a teaching platform for integration of production and education, and improve the introduction of design talent resources^[7]. At the same time, use excellent design talent resources in colleges and universities to improve product research and development capabilities, integrate supply chains, connect colleges, design, and manufacturing industries with talents, continuously optimize corporate talent resources, and gradually form a stable corporate talent structure, thereby promoting the upgrading of the entire industry develop.

6.3 Matching relationship between supply side and demand side

The results of actual design cases of enterprises are integrated into classroom teaching to guide students to understand the frontiers of industrial development. At the same time, enterprises can also use this as an opportunity to select students with strong professional abilities to enter the enterprise for internship and participate in relevant product development projects, thereby effectively solving the supply side of talent education and Manufacturing demand focuses on large structural contradictions. Among them, as a provider of design talent training, colleges and universities focus on cultivating professional cognition, innovative thinking, professional skills and quality education; the key is to continuously improve talent training goals, talent training approaches, talent training methods and means, and talent training standards and standards^[8]. Evaluate research; mobilize students' enthusiasm for professional learning, etc., to achieve the purpose of improving teaching quality. Enterprises, as the employment demand side of design talents, need to provide design talents with professional visits and internship opportunities, complete design project processes, first-line production process training opportunities and professional experimental platform innovation platforms; use outstanding design talent resources in universities to improve product research and development capabilities, Integrate the supply chain, connect universities, design, and manufacturing with talents, form a stable enterprise talent structure, and promote the upgrading of the entire industry.

7. Summary and Outlook

Although some researchers have been carried out on various aspects of team learning and some achievements have been made, there are still great differences in the views of scholars on the connotation, structure and measurement scale of team learning, and many issues still need further research. Combined with the existing problems in current research, we believe that future research in this field can start from the following aspects.

7.1 Definition of the concept of team learning

Although foreign scholars have proposed many concepts of team learning from different perspectives, the academic circles have not yet reached a consistent conclusion on the connotation of team learning, which will inevitably have a negative impact on future research on team learning. Therefore, in the future, it is necessary to strengthen the research on the connotation and concept of team learning, and summarize the definition of team learning with Chinese local characteristics, which will help promote the in-depth development of team learning research.

7.2 Research on team learning structure and development of measurement tools

At present, most researchers only conduct theoretical and empirical research on team learning from one aspect. The structural content of team learning has not yet reached a consistent conclusion. Most researchers develop team learning measurement questionnaires based on their own needs. Many measurement tools have not been validated test. Therefore, it is necessary to integrate the current research conclusions of team learning to further explore and verify the structure of team learning. Therefore, it is urgent to develop team learning measurement tools with high reliability and validity, and to test the effectiveness of existing measurement tools.

7.3 Carry out cross-cultural comparative research on the relationship between team learning and related factors

At present, most of the researches on team learning are carried out in the background of European and American culture, but in the background of oriental culture which emphasizes collectivism, the formation of team learning and its influence process and effect on individuals, teams and organizations may be more obvious. In this case, it is very necessary to carry out cross-cultural research on the relationship between team learning and related factors. Before the foreign research conclusions about team learning have not been verified by localization, domestic researchers and practitioners can only learn from and refer to foreign research conclusions, and cannot directly copy them. In addition, it is also necessary to conduct repeated tests on some of the existing research results and actively conduct cross-cultural comparative research, because these research results may vary due to different cultural backgrounds, specific situations or subjects. Therefore, localized research on the relationship between team learning and related factors in the context of our country has very important practical significance.

References

- [1] Mao Liangbin, Zheng Quanquan. Review of team learning research [J]. *Ergonomics*, 2018(4).
- [2] Mao Liangbin. Effective psychological model of team learning: concept, theoretical structure and measurement [J]. *Economic Forum*, 2018(5).
- [3] Chen Guoquan, Zhao Huiqun. Psychological preparation model for team learning [J]. *Science and Technology Management*, 2019(6).
- [4] Wu Tiejun. The impact of team learning orientation and team conflict on team performance [J]. *Journal of Suzhou University (Philosophy and Social Sciences Edition)*, 2020(6).
- [5] Wang Wenxiang, Han Jingxuan, Gao Wenhe. Research on the Influence Mechanism of Team Learning on Enterprise Soft Power [J]. *Journal of Jinan University (Social Science Edition)*, 2020(1).
- [6] Wang Yanfei, Yang Yi. A review of the theory and related research progress of team learning [J]. *Advances in Psychological Science*, 2020(7).
- [7] Bao Gongmin, Wang Jie. Research on the relationship between team task conflict, team leadership behavior and team learning [J]. *Psychological Science*, 2021(6).
- [8] Peng Can, Zang Jingjing. Empirical Research on the Relationship between Team Leadership Style and Team Learning Ability [J]. *Science and Technology Progress and Countermeasures*, 2022(15).