



## KNOW-WHY & KNOWHOW AS TOOLS FOR LEARNING AND DEVELOPMENT: ITS IMPACT ON INNOVATIVE PROJECTS AND ITS DISSEMINATION IN AN INTEGRATED STEEL PLANT

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### ABSTRACT

*Learning and development are essential ingredients of human nature. It is true for the organizations also. They have gained greater significance for the organizations as their bottom line is under tremendous pressure due to several challenges including fierce competition, globalization, rapid technology changes, shorter cycle times and increasing customer demands. The need is to promote learning & development, transfer & apply knowledge effectively all across the organization to stay ahead in change. A learning organization continuously promotes learning and development at the individual level as well as at the organizational level. The paper discusses know-why and knowhow as two important tools for learning and development and evaluates their impact on innovative and improvement projects in an integrated steel plant for better dissemination and application throughout the organization. It also discusses the process and types of learning and development and suggests an 8-point framework to promote it in the organizations.*

**Key words:** Learning, Development, Know-why, Knowhow, Change Management

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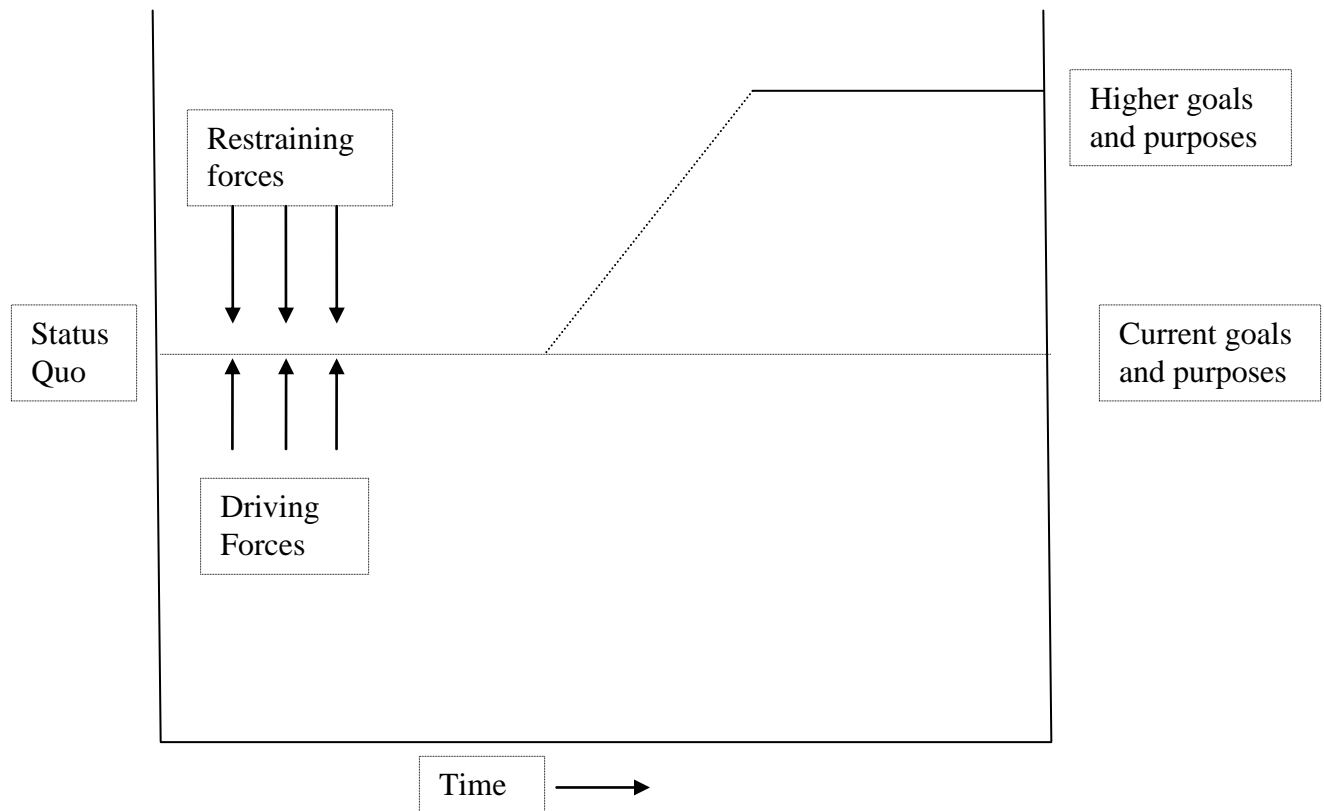
## **1. Learning & Development – Interconnected**

Learning and development have cause and effect relationship. A cursory look at people's lives shows that learning is fundamental in human nature. The most exciting and satisfying experiences are those moments and periods when there were significant elements of learning to do. However, it is not just learning to do anything but learning to do something that people care for and are passionate about. The children learn to talk, walk or ride a bi-cycle because they want to do so – not for rewards but because they want to. Incidentally, the development of a child is the maximum during their period of significant learning and practicing. It is true for an organization also. In an environment of growing uncertainties, the organizations are facing several performance challenges from fierce competition, globalization, abrupt technology changes, shorter cycle times and stringent customer demands threatening to disrupt their profitability. Under such intense pressures, the essence of improvement in profitability lies in creating superior performance by improving quality and delivery at reduced costs. In people front, it throws up several challenges like i) enhancing changeability, ii) dealing with skill obsolescence, iii) attracting, retaining and developing intellectual capital, iv) developing an energized, committed and empowered workforce, and v) being responsive to stakeholders' expectations and demands. In such a situation, learning is one of the key competencies required by any organization to create a sustainable competitive advantage. The underlying emphasis is on learning how to do things better and continuously transferring the knowledge and developing people across the organization. The learning organizations derive the competitive advantage from continuous learning – both individual and collective. At the individual level, learning is primarily concerned with gaining knowledge and developing skills. At the organization level, it is concerned with changing perceptions, developing vision, formulating strategies and transferring knowledge. Hence learning at both levels – individual and organization need to focus on recognizing, creating or exploring new knowledge and generating new ideas and concepts by use of knowledge and understanding. Any organization which promotes and facilitates the learning of all its members and continuously transforms itself is known as a learning organization. A learning organization fosters development of its people through a non-threatening and empowering culture where leadership, management and workforce strive to continuously develop organizational competencies<sup>1</sup>. Through the process of learning and development, the organization achieves higher performance and its people derive satisfaction and find personal rewards.

## 2. Learning & Development – Key issues

In a striking similarity, both organizations and organisms develop self-maintaining systems so as to preserve an order, which has evolved over the years. While the organisms pass on biological characteristics through genes, the organizations develop cultural traits and transmit the same through habits, procedures and patterns. It is evident that these traits can potentially inhibit an organization to develop a new pattern in tune with time thereby resulting in stunted growth. While there is a need to put systems in place, there is a pressing need to enhance the learning efforts in the organizations to embrace change as well as to stay ahead in change. In today's context, the distinction is that in case of organizations, it is not merely a question of evolution but a matter of survival also. Thus the emphasis should be on fostering the conditions in which individual and collective creativity can flourish and contribute to the organization's ability to achieve results<sup>2</sup>. It requires cultural change and reengineering of organizational processes. According to Lewin<sup>3</sup> (1951), all systems including organizations remain at a state of equilibrium because of two opposite forces: driving or facilitating forces and restraining or hindering forces. The driving or facilitating forces are the factors, which facilitate the organization to move towards its goals while the restraining or hindering forces are the factors, which prevent the organization to move up. These two opposite forces make equilibrium to lead to a state called status quo. For bringing in change in an organization, the status quo needs to be disturbed by strengthening the facilitating forces and / or weakening the impact of hindering forces. The Driving forces – Restraining forces model has been shown at Figure-1.

**Figure-1: Lewin's Driving forces – Restraining forces model**



The continuous learning and development efforts can unsettle the status quo and push the organization to higher levels. But the challenge is to determine the improvement initiatives, which can push the organizations to the higher orbit of performance. A study shows that not all improvement efforts to boost operating productivity pay off. Lapre and Wassenhove<sup>4</sup> (2002) in their research found out that not all local improvements translate into productivity gains for the factory as a whole, or the plant wide cost reductions peter out as the learning curve levels off. They looked at the characteristics of different types of improvement projects and showed why knowledge was transferred in some cases but not in others. It was an attempt to help all manufacturers get far better returns on their investments in enhancing productivity. After studying several projects carried out at the Belgian manufacturer N.V. Bekaert S.A., the world's largest independent producer of steel wire during 1980s and early 1990s, they observed that only 25% of improvement projects delivered factory wide improvements. Interestingly, half had no bottom line impact whatsoever, and even more surprisingly, the remaining 25% had a negative impact on the plant's overall productivity improvement. The projects having factory wide impact had three overriding characteristics: They produced process knowledge that was firstly well

understood, secondly broadly relevant and thirdly the knowledge was transferred to other parts of the factory - an outcome that's by no means automatic.

### **3. Know-why versus Knowhow : Data Analysis**

The innovative / improvement projects in factories have two broad aspects: know-why and knowhow. The know-why aspect aims at understanding the cause and effect relationship using scientific tools to develop a theory. The knowhow focusses on the process of implementing a theory and getting positive results. Through know-why, the team understands why a problem happens. On the other hand, the team applies it and makes it work through knowhow.

Durgapur Steel Plant, a unit of Indian steel major Steel Authority of India Limited (SAIL) has a structured on-line innovation scheme, which was introduced three years back. In this scheme, employees are encouraged to undertake and record innovative projects carried out in different shops and departments in the plant. Each year, the innovative projects are evaluated by a team of experts on four criteria: originality, utility, financial & non-financial benefits and quality of presentation. All the criteria carry equal weightage. However, the innovative projects recorded in the scheme are diverse in nature covering various departments.

A study was undertaken to assess the possibility of wide dissemination of innovative projects carried out in a particular shop / department to other shops / departments. 253 nos. of innovative projects in 3 years under this scheme carried out in different departments were taken up for evaluation. These innovative projects were evaluated on three parameters: know-why (v1), knowhow (v2) and possibility of wide dissemination (v3). The ratings of each project were given in these 3 parameters in the following 5-point scale:

1 - Very Weak; 2 - Weak; 3 - Somewhat Strong, 4 - Strong; 5 - Very Strong

An attempt was made to investigate the relationship among know-why (v1), knowhow (v2) and possibility of wide dissemination (v3) with the function  $v3 = f(v1, v2)$ , where v3 is taken as the dependent variable and v1 & v2 are taken as independent variables. The model equation is represented as:

$v3 = B1 * v1 + B2 * v2 + C$ , where B1, & B2 are co-efficient and C is constant.

A regression analysis was done by using SPSS (Version 21) to analyse the relationship among know-why (v1), knowhow (v2) and possibility of wide dissemination (v3) on these 253 nos. of datasets of innovative projects in 3 years. The following are the results:

**Table-1**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.890 <sup>a</sup>	.792	.790	.594
a. Predictors: (Constant), v1, v2				

**Table-2**

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.958	.121		-7.889	.000
	v2	.699	.041	.583	17.048	.000
	v1	.488	.039	.429	12.569	.000

a. Dependent Variable: v3

$$v3 = -0.958 + 0.699*v2 + 0.488*v1 \text{ (at 5\% sig level)}$$

**Table-3**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.536 <sup>a</sup>	.287	.285	.966
a. Predictors: (Constant), v2				

From Table-1, it can be inferred that in 79.2% cases, v3 can be predicted through v1 and v2 from the equation mentioned at the end of Table-2. The R-square value of 0.792 at Table-1 denotes a good fitness of the equation  $v3 = -0.958 + 0.699*v2 + 0.488*v1$  (at 5% sig level). The R-value of 0.890 in Table-1 signifies that v3 is highly positively correlated with v1 and v2.

It is known that if  $t > +2$  or  $t < -2$ , then it implies that all parameters i.e. v1, v2 including constant are important to predict the dependent variable i.e. v3. In Table-2, with t-values of v2 being 17.0489 (much higher than +2), v1 being 12.569 (much higher than +2) and Constant being -7.889 (much less than -2), they are highly statistically significant.

In other way, if p-value is less than 0.05 (i.e.  $p < 0.05$ ), it signifies that all the independent parameters (i.e. v1 and v2) and Constant are statistically significant. In the instant case at Table-2, p-value being 0.000 for all three, they are statistically significant. Moreover, with R-square value of 0.287 (highly less than 0.5) in Table-3, it indicates no multi-collinearity i.e. no dependency of v1 and v2 on each other.

Hence combining Table-1, Table-2 and Table-3, it can be inferred that when know-why and knowhow (mostly independent of each other) scales of the projects are defined, then the possibility of wide dissemination of those projects all across the plant can be predicted by a model.

The innovative projects are broadly placed in 2x2 matrix with high or low know-why and knowhow. The matrix has been shown at Figure 2. In the self-explanatory 2 x 2 matrix, the four quadrants have been named as Kneejerk reactions, Artistic skills, Bookish approach and Transmissible sustainable solutions.

**Figure-2: Know-why - Knowhow Learning Matrix**

Know-why ↑	High	Bookish approach	Transmissible sustainable solutions
	Low	Kneejerk reactions	Artistic skills
		Low	High
		K Knowhow →	

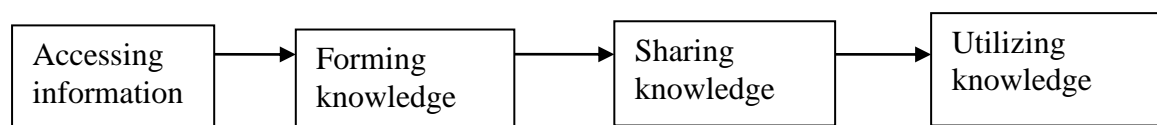
In projects with low levels of know-why and knowhow learning (termed as kneejerk reactions), people simply try to solve the problem without using scientific insights. Projects with low know-why but high knowhow are generally the output of artistic skills as the ‘why’ part is poorly understood and the solutions don’t transfer easily. In projects with high know-why and low knowhow learning, teams come up with highly theoretical solutions without proper implementation. However, in projects with high levels of know-why and knowhow (Transmissible sustainable solutions), teams rely on scientific insights to implement changes and produce transmissible and replicable results. The knowledge of transmissible sustainable solutions can be passed on and can be adopted by other employees all across the organization for effective implementation in their domains also. The regression analysis also shows that the possibility of wide dissemination of the innovative projects, where know-why and knowhow are high, increases substantially.

The organizations must strive at transferring and transmitting the knowledge of improvement projects that are more likely to address both know-why and knowhow and they will be well assimilated in the organization. Once the projects are selected for wide transmission all across the organization, the learning and development process must be fostered.

#### 4. Process of Learning & Development

The learning and development process in an organization is a complex one with four broad steps to be followed systematically. It is represented at Figure-3.

**Figure 3: Learning & Development Process**



- a. Accessing information – It is the first step to learning. The organizations need to generate valid information pertaining to various operational, technical and human parameters both from within and also from the external environment. With the advancements in information technology, it is available in abundance. It should be made easily accessible to all employees.
- b. Forming knowledge – Information is the basic input for knowledge formation which in turn facilitates generation of new ideas, insights and development of appropriate attitude.



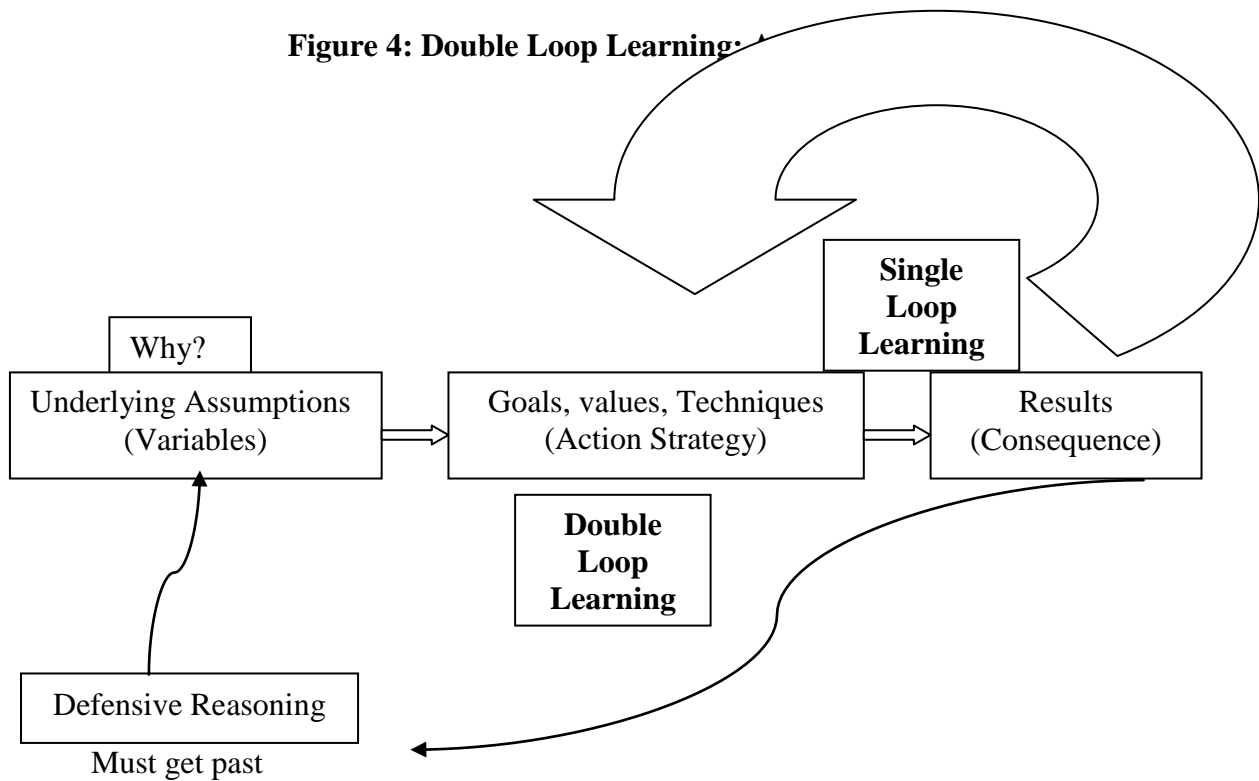
- c. Sharing knowledge – The sharing is essentially required for validation. It also leads to enrichment of knowledge as well as acceptance and commitment to the knowledge especially by those who will play a critical role for giving concrete shape to the newly acquired knowledge and ideas.
- d. Utilizing knowledge – The validated and accepted knowledge need to be utilized for bringing improvement in outputs and related parameters like quality, cost, delivery and service. It will usher in change in approach to problems at individual and collective levels.

In essence, an effective learning and development process would lead to change and transformation and would bring about shift in the way we look at reality individually and collectively.

### 5. Types of Learning & Development

Argyris and Schon<sup>5</sup> (1978) identified two types of learning in organizational context: single loop learning and double loop learning. The schematic diagram of single loop and double loop learning has been given at Figure-4.

**Figure 4: Double Loop Learning:**



The focus of single loop learning is on taking corrective actions in case of errors and deviations from the standards to return to normalcy. Breakdown maintenance of machines is an example of single loop learning. The double loop learning focusses on modification of an organization's underlying norms, policies, structures and objectives. It involves identifying corrective actions to remove the cause itself so as to prevent the recurrence of the same. The double loop learning helps the organization to make informed decisions in the rapidly changing and uncertain situations where the cost of error is very high in the competitive market<sup>6</sup>. Another type of learning in the organizations is called Deutero learning. It attempts to streamline and improve the learning process itself so that effective learning could take place throughout the organization.

## **6. Framework for promoting Learning & Development**

Peter Senge<sup>7</sup> (1990) in his book 'The Fifth Discipline' defined learning organizations as 'a place where people continually expand their capacity to create results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free and where people are continually learning how to learn'. Senge, Ross, Smith, Roberts & Kleniner<sup>8</sup> explained 'learning in an organization means the continuous testing of experience and the transformation of that experience, into knowledge – accessible to the whole organization and relevant to its core purpose'. Gravin<sup>9</sup> defined 'a learning organization is an organization skilled at creating, acquiring and transferring knowledge and modifying its behaviour to reflect new knowledge and insights'. From the above definitions, the following questions have been prepared to ascertain whether an organization is promoting learning and development in the organization. These are:

- i) Is the organization willing to examine and challenge its age-old beliefs and practices, which might have yielded results so far?
- ii) Has the organization designed new structures for testing?
- iii) Is the knowledge accessible to all the employees?
- iv) Does the organization actively manage the learning process to ensure that it happens by design instead by chance?
- v) When people raise potentially negative information, is it snubbed?
- vi) Is the organization showing capability, which it didn't have before?

- vii) Is the organization agreeing to convert the potential for improvement into reality by bringing about accompanying changes in the way works get done?
- viii) Is the organization willing to re-examine the policies and practices for promoting learning and development process?

The above questions are to be asked to gauge whether an organization is promoting a culture of learning and development. The following are 8-point framework that can trigger the learning and development culture in the organization. These are:

1. Thrive on change – The importance of change is obvious. However, it is vital that the changing process be driven from the very top levels with a clear vision of what is to be achieved.
2. Encourage experimentation – An organization with a strong commitment for learning and development needs to experiment by having both formal and informal ways of asking questions, seeking out theories, testing them and reflecting upon them. Just like the changing process, the learning process has to start from the top and should find its way throughout.
3. Communicate success and failure – It is important for a company to learn from its mistakes and also to celebrate its successes. A true learning organization will treat mistakes as case studies for discussion and learning. It will also appreciate the successes.
4. Facilitate learning from surrounding environment – Gravin<sup>10</sup> coined a term called SIS, which stands for ‘Steal Ideas Shamelessly’. Steve Jobs once assertively said, ‘We have always been shameless about stealing great ideas to be implemented at our workplace’. The sublime message was to adopt excellent ideas developed elsewhere as enthusiastic borrowing to replace the syndrome of ‘not invented here’. To maintain a cut-mark over others, a learning organization needs to be in sync with its internal and external environment. The joint ventures provide excellent opportunities to observe how other systems are operated. The customers are the valuable research and development partners as they exactly know what they and the market want.
5. Facilitate learning from employees – Kanter<sup>11</sup> commented, ‘Employees themselves, more often than not, know what needs to be done to improve operations. The financial implications of learning from within offer long-term bonus. She calculated that only 20% of an employee’s potential are utilized. This inefficiency can easily be overcome by training, multi-skilling and redeployment.

6. Reward learning – A learning culture must reward innovation efforts. Apart from on-the-spot recognition and appreciation, the annual performance reviews for pay rise and promotion must serve well for the long-term feedback and reward.
7. Behaviours to discourage – Kanter<sup>12</sup> suggested some organizational behaviour, which are stifling in nature and should be shunned. These include treating any new idea with suspicion, expressing criticisms freely but withholding praise, treating problems as a sign of failure and making decisions to reorganize or change policies in secret and throwing them on people unexpectedly.
8. Behaviours to encourage – Top leaders and managers should serve as learning role models by sharing their own learning goals and by encouraging others to learn. The individual employees must be encouraged to accept responsibility for their own careers and their own personal learning.

## 7. Conclusion

Learning and development are two key competencies, which need to be institutionalized in the organizations facing highly competitive markets. For promoting learning and development in the organization, a solid foundation can be made by taking awareness, environment, leadership, empowerment, learning, experimentation, training and transfer of knowledge into account. The focus should be more on transferring and transmitting the knowledge that are more likely to deliver both know-why and knowhow of the improvement projects / initiatives. An 8-point framework has been suggested to promote learning and development in the organizations.

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