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A Strategic Approach For Learning Organizations: Mental Models

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Abstract

Mental models which is figured by Senge in his book “The Fifth Discipline” published in 1990 was mentioned as a proper way of thinking for the learning organizations in every step of the management. In this study the generation of mental model configuration process is deeply defined and dimensions of the model is explained. The relation between Argyris’ left column, facing with reality and learning organization has been stated in this study and the variables of these theories and their connections within organizations increased the quality of forming mental models as a result.

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1. Introduction

Developing an organization’s working capacity through mental models requires both learning new skills and implementation of organizational innovations which allows these skills to be used in daily practice. Mental (Intellectual) models affect our thinking style, understanding system and actions through assumptions and generalizations which are stereotyped, strongly imprinted and deeply rooted in our minds. Mental models are used for the purpose of providing discipline and allowing people to get rid of these patterns and assumptions. In order to become learning organizations, organizations firstly need to change their thinking models; in other words, learn how to think (Yazıcı, 2011: 162). In the process of learning, mental models carry a great importance. According to Chris Argyris, who is an administrative scientist, our mental models actively influence the decisions we take in our lives. The purpose of organizations is to exist to follow a common path to reach goals that a person cannot achieve by himself and when these mental models are used in a manner to support leaning within the organizational structure, they will have positive

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effects (Taştan, 2006). Work discipline in mental models begins by turning the mirror inwards. It requires to learn about the horizons and visions that we have inside and to analyze them correctly. At this point, the skill of making learning speeches which balance questioning and justification is important. In these speeches, people effectively present their own thoughts and open their thoughts to other's influences (Çam, 2002: 73).

2. The Definition and Importance Of The Mental Model

Organizations do not have brains; they are system constructors and experts (Shafritz and Steve, 1991: 47). Individuals can change their personalities, beliefs and mental models; new individuals either join to the organizations or leave the organizations. However, organizational memory, permanent behaviors, mental maps, norms and values are fixed (Fiol and Lyles, 1985: 55). Senge defines mental models as assumptions, generalizations, pictures and images which are deeply-rooted in our minds and have the ability to influence how we understand the world and our actions. Argyris defines mental model using a different term as theories in use. In fact, the term mental models is a concept which is contemporary, does not have boundaries and involves continuous changeability; because as problems or the situations which come across, increase or get complicated, that the need to create mental models will increase as well in direct proportion to these. Prior to forming mental models, individuals need to have a purpose. An optimal mental model needs to be constructed while dealing with the purpose in question.

Knowing the variables in our environment and that these variables partly or fully change or are updated, understanding the problem, being knowledgeable about the variables which make up the problem and as a consequence creating a channel between the problem and the mental model we create and choosing a suitable mental model for the problem through strengthening the channel with correlations should be the basis. Thus, it becomes inevitable to solve the problems in a shorter time with lower costs. The main problem here is unknowing how and in which situations or conditions the mental model will be created, because however knowing the numerous variables speeds up our process of forming mental models, it may also take us to erroneous analyses. This may create the wrong solution variable in terms of the solution variable. Forming mental models and more importantly, implementing them is valid, not only for administrators, but also for ordinary people who face problems in daily life as well. The use of mental models on the basis of contingency approach both during the learning process of learning organizations in particular and their learning, is used as a tool in solving problems.

3. The Process Of Forming Mental Models

To be able to form a mental model, firstly there should be a reason for creating a mental model. These reasons in general emerge as problems in learning organizations. In order to be able to form mental models, the problem needs to be understood correctly. Therefore, the variables which make up the problem and the roles, these variables play within the problem and in addition the fact that the problem variables in questions will change should not be forgotten. The formation of mental models takes place progressively. Different definitions have been made for the concepts of system thought and formation of mental models system. In general, it is a whole which consists of units which regularly influence every element of the system that are connected to each other, different parts and is formed in accordance with a general plan and directed to a goal with the purpose of reaching a specific process. Systems emerge as a result of the operation of a systematic series made up of parts as a whole, towards the general goal of the sum. According to Ackoff, system is a whole made up of variables which have a relationship with each other, act towards a specific goal and are related to each other. In addition, system is a grouped and inseparable totality which consists of two or more variables which have interactions between them and have a specific limit in terms of their functions and characteristics and is a product of objects or beings that have a relationship with the external environment. It is also the mechanism that puts forward the theses which are created during the adjustment process of the parts that makes up this whole with linking one to another. The hypotheses of mental models are used to reveal truths, whereas system focuses on the result by taking the rational aspect among the outputs of the mental model. Thus, forming mental models becomes the reason for integrating the skills related to system thought. Therefore, as Senge states, "A majority of our research at MIT focuses on the issue of helping administrators in the integration of the skills of forming mental models and system thought" (Senge, 2011: 225).

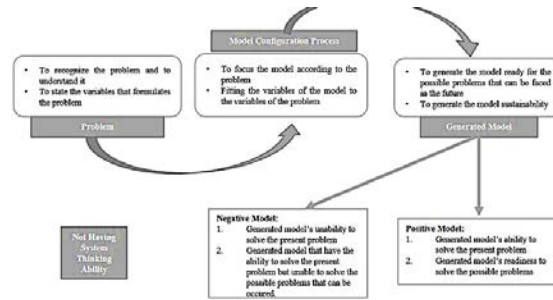


Fig. 1. Mental Model Configuration Process

In the figure, the first requirement is to recognize and understand the problem. Without understanding the problem and identifying the variables which constitutes the problem, it is not possible to skip to the formation stage of the model. After understanding the problem, it is necessary to focus the model to the program needs or simplify the problems with the model in the model formation process. The identification of the variables of the model to be created is carried out in this stage. The model is formed finally after the formation process of the model. Besides the formation of models solving the problem, what is more important is that the basis should be the model's readiness in terms of potential problems and the assurance of the continuity of the model. After the model is formed, the quality of the model becomes apparent through positive and negative model sampling. Positive model is a type of model which can always be used, can renew itself and can adapt to new generation problems and their solutions.

4. An Analytical Look To The Mental Model Variables

4.1 Infrastructure and Culture

Analyzing a problem in the face of any given problem, identifying the variables which constitute the problem and differentiating them, depends on the infrastructure of the organization. Analyzing the source of our mental models allows us to understand them efficiently. Whether natural characteristics or those acquired afterwards are more efficient in terms of shaping our thoughts is a discussion which has been going on for a long time. It seems that heredity basically determines who we are and what we can do. Experience is effective on shaping these skills and on strengthening some of them while weakening others. The most important aspects which determine our infrastructure have been listed below as follows (Karaaslan, 2015):

- Learning
- Education
- Influence of others
- Awards and encouragements
- Personal experience
- Secondary learning type

The aspects listed above are those which form the infrastructure in our mental model. The quality of other variables which form the mental model are in fact equal to the quality of the infrastructure; because increasing the quality of our infrastructure is useful for us in terms of what, how, where and when we do things and making rational decisions in the formation process of mental models. In the formation of mental models, another variable is culture. Culture is in fact one of the aspects involved in the formation of infrastructure. Therefore, while culture is an independent variable, infrastructure is a dependent variable; because culture allows the formation of our infrastructure in terms of reasoning, experience, point of view towards problems and the quality of situational awareness within the conditions a person is in. Our culture is permanent. We need to change culture less in comparison to infrastructure, however we can change infrastructure with a cultural point of view. For instance, if the research samples of a company depend in general on quantitative and empirical researches, there needs to be an infrastructure in the numerical analysis in the organization a person works in. Therefore, if a person's own culture is formed in a level which will create the infrastructure or adapt to it, it will adapt to the organization's corporate culture as a consequence as well. Organizations have different corporate cultures in accordance with their physical infrastructures, purposes, values in relation to the

world view and system of thought. It is possible to define corporate culture as basic values, beliefs and system of thought which are created under the influence of the structure within corporations (Dinçer, 2003: 334). Schein states that corporate culture consists of existing strategies, recognized values and underlying assumptions. According to Shrivastava, corporate culture predicts the actions to be taken by corporations (1983: 20).

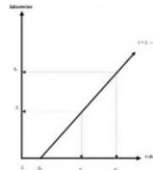


Fig. 2. Infrastructure and Culture Relationship

In the figure above, the relationship between infrastructure and culture has been presented as a linear relationship. According to the figure, the culture variable © is an independent variable, whereas as the infrastructure variable (I) is a dependent variable. The C0 point is an indication that culture exists prior to the formation of a person's infrastructure. The quality of the formation of culture gradually determines the infrastructure. This is the indication of the conformity between culture and infrastructure. The equation of the function is $I = C - C_0$.

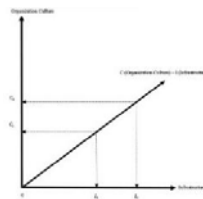


Fig. 3. Infrastructure and Organization Culture Relation

In the foundation of corporate culture, basic beliefs, assumptions and system of thought are found. Basic assumptions show us what we need to pay attention to, how we can act emotionally about what happens and how we need to behave in various situations that emerge (Schein, 1997: 22). Therefore, corporate learning depends not only on adaptation of the emerging developments and changes, the behavior, learning manner of rules and instructions of the members of organizations, but also on the basic values and beliefs of organizations; in short, to corporate culture (Akdemir, Çukacı: 2009: 1191).

In the figure above, infrastructure is the independent variable and corporate culture is the dependent variable; because in order for the formation of corporate culture to be possible, firstly infrastructure needs to be formed. According to this figure, corporate culture and infrastructure is presented as a linear function and corporate culture' reaches a specific level depends the least on infrastructure. Therefore the equivalent of infrastructure in the I1 level is C1, as well as corporate culture. The equation of this function is $C \text{ (corporate culture)} = I \text{ (infrastructure)}$.

4.2 Transparency and Efficiency

Transparency is regarded as the antidote of the aspect which is defined as the game playing illness which is dominant in human behavior in face to face meetings. Whereas efficiency is defined as making the most suitable decisions for the benefit of organizations.

Transparency means accepting the situation fully as it is. Another concept which completes the concept of transparency is efficiency. Efficiency can be defined as the state of making the optimal or rational decision. The formation of an efficient model can be explained through the game theory. The influence of operational researches on the decision making process can be formed through the efficiency phenomenon. In short, the establishment of the understanding of transparency and efficiency causes the following belief: As the skills of bringing various points of view of people towards the world and arguing productively increase, their decision making processes can become different (Senge, 2013: 207). As it can be understood from the explanation above, transparency should be present

before the formation of efficiency.

4.3 Science of Action

The science of action is the method of reasoning in the formation process of mental models. The theory in action involves the strategies of existing action, its values accepted by the administration in terms of choosing the strategy and the underlying assumptions (Argyris and Schön, 1996: 13). The writers have stated that the theory in action emerges in two different manners in organizations or for individuals. These are the advocated theory and the theory in use. What is meant by the advocated theory is the explanation or interpretation of the pre-determined action (model). The theory in use is the part of the performance of the theory in action which is implicitly defined (Argyris and Schön, 1996:13). The theory in use embodies values, assumptions and strategies and consists of their results (Shrivastava, 1983:11).

An organization's self acceptance in the organization without creating conflicts will have great importance in terms of providing continuity for the organization.

4.4 Thoughtful Action

Thoughtful action is nested with the science of action, concepts of investigation and balancing defense. As we have explained above, the science of action is the method of reasoning which lies in the foundation of our actions. The science of action is nested with the concept of contingency approach as being able to think within action. Idioms such as thinking on one's feet, being sound minded and learning through actions not only shows what we think about performing actions, but also shows that we can think about how we do something while doing it (Senge, 2013: 212). It is assumed that an instruction (cause) given by a supervisor of executive level to an official who is at a lower level in the hierarchy will be transmitted as it is and carried out (effect) in a perfect manner as planned. However, numerous studies in literature state that the "implementation process" is not linear and deterministic and that it is a non-linear process on the contrary (Stacey, 2000; 2001).

As stated in the explanation in question, formation of mental models requires the recognition and comparison of not only what we study and do not study, but also what is studied and not studied by others. Therefore, it is identifying the shortcomings, questioning organization and balancing defense. This means facing the reality. Organizations' forming good mental models means that they are required to deal more with what is happening rather than what needs to be happened. Thus, organizations will continuously question themselves in the process of model formation; in other words, they will learn how to investigate. As a result, there is a linear relationship between the science of action and balancing with defense in terms of contingency. In this relationship, the independent variable is balancing with defense and the dependent variable is the science of action.

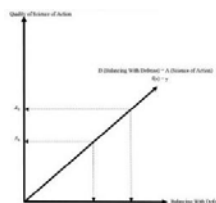


Fig. 4. Science of Action and Balancing With Defense Relation

In the figure above, it can be seen that the more we increase our process of balancing with defense in a positive manner, the science of action which is the dependent variable which will change according to the independent variable or our thinking within the action will be more positive as well. The revelation of reality through balancing with defense will create corporate action in accordance with the existing reality at that moment. Thus, as a result of facing reality to be created through balancing with defense, our science of action will seek answers as to how actions should be created under which real situations and will provide corporate learning.

4.5 Abstraction Jump

Abstraction jump is to reach generalizations by seeing a specific acquired situation rather than seeing numerous details. This constitutes looking without seeing the number of variables or looking by ignoring the number of variables, rather than looking with many variables. Thus, an individual who carries out abstraction jump will reach generalizations through simple sampling without going into details and gets removed from the basic reality. In today's complicated world, it makes it impossible for individuals to evaluate and acquire all knowledge sufficient to make rational decisions (Simon, 1997: 323). There are practical difficulties such as time, insufficiency of financial sources and limitation of individuals' knowledge capacity and these difficulties are not fixed; on the contrary, they continuously change in accordance with the environmental conditions of the organization in which individuals make their decisions. Simon presents administrative-man who is after "satisfice" with the limited sources in hand, rather than economic-man who makes the most productive decision in the rational approach of classical scope. According to Simon, the individuals (administrative-man) try to make decisions which can create rational and acceptable results through the limited amount of possibilities (Çelik, 2010: 221). Abstraction jump is the transformation of instantly taken pictures into generalizations. These generalizations cannot be tested and the assumptions of the past begin to be treated as real. Argyris defines abstraction jump as follows:

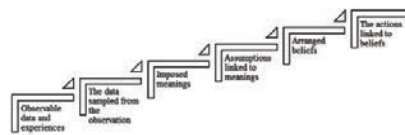


Fig. 5. Argyris' Output Generation Steps

The ladder of inference has 3 basic benefits. The first is that, the individual makes aware of himself and reflect himself; the second allows the thoughts of the individual to be more significant. The third allows the individual to question the thoughts of others (Doğan, 2001: 103).

There is a direct relationship between making one-dimensional analyses and becoming close to mistakes. In fact, generalization we make by considering a single variable instead of multiple variables which can affect a certain situation cannot go beyond an assumption. Therefore, abstraction jumps emerge when we move towards generalizations without testing our direct observations (tangible data). Abstraction jumps prevent learning, because they have acquired the characteristic of being actions. What is once an assumption is now treated as reality (Senge, 2013: 214).



Fig. 6. Abstraction Jump and Learning Organizations Relation

In the figure above, abstraction jump has been shown as x independent variable, whereas the learning quality of the organization has been shown as y dependent variable. The relationship between Abstraction Jump and the Learning Quality of Organizations is inversely proportional and its equation has been formulated as $y = \frac{x}{x_1} + \frac{y}{y_1}$. According to this equation, as abstraction jump increases, the learning quality of organizations decrease. Therefore, since seeing a specific acquired situation instead of seeing numerous details created by abstraction jump and arriving at generalization will deprive us of other variables or information, our learning quality within organizations will decrease accordingly. On the contrary, if we see many variables within organizations and perceive them within a certain system and elude abstraction jump, then our learning quality within organizations will increase in the same amount.

4.6 Left Column

Senge does not advocate telling everything we think. However, he argues that if both sides being by doing their own left-hand column practice in a learning deadlock and share these with each other, then everyone's contribution will accelerate the speed of the solution of the deadlock (Tamer, 2015). The left-hand column is a technique which shows us how and what kinds of solutions our mental models will present in certain situations. The left-hand column practice always allows hidden assumptions to come to the surface and allows us to see how these affect our behavior. In the left-hand side, things which are considered during an exchange but not stated are written. The most important lesson we can learn from the left-hand side columns is that, we waste learning opportunities in conflicting situations. Instead of facing our problems, we in general move about an individual or individuals and subjects. Instead of knowing how to proceed to solve our problems, we verify our conversations without determining an action path. We do not even clearly define the problem which in reality requires action (Senge: 2011, 216-218).

Thought – Felt Position	Told Position

Fig. 7. Argyris' Left Column Application

Argyris' left column technique consists of three parts. The first part involves choosing the problem; the second part involves writing our thoughts about the problem in the left-hand side column and finally the third part consists of writing the issues which are thought about each record but not brought forward in the right side of the column. The application of the figure brings certain hidden assumptions to the surface and shows how these assumptions influence behaviors. Through this application, a learning opportunity can be created by skirting around the problem, instead of facing the problem in conflicting situations. This contributes to the identification of problems and continuity of development (Doğan, 2001:104).

As explained above, the first rule of learning is to see and accept reality. Keeping unsaid things inside means that we miss an opportunity to learn, because we are scared of the other party's reactions which do not see the unsaid things we keep to ourselves. In fact, this fear is an indication that the individual himself has not learned anything. The more we share what we keep inside, the more right or wrong information we acquire. We become closer to analyzing this right and wrong information, seeing the reality and forming purposes. Therefore, the coming of reality to light results in the formation of mental models and this formation leads to learning. The left-hand side column is a method of bringing reality to light and it becomes inevitable through this method that we create and learn mental models.

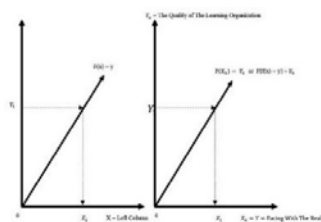


Fig. 8. Left Column, Facing With Reality and Learning Organization Relation

In the first figure above, a linear relationship has been formed between the left-hand side column application and facing with the reality. In this relationship, as the left-hand side column application (Independent variable= x) increases, facing with the reality (Dependent variable= y) increases in the same amount. The proportion between them is direct proportion. Therefore, the function equation is $f(x)=y$. Thus, an x_1 amount of left-hand side column application creates an influence of y_1 in facing with the reality. In the second figure, a linear relationship has been formed between facing with the reality and learning quality of organizations as well. According to this relationship, facing with the reality whose value changes in accordance with the left-hand side column has become the independent variable ($x=y$) and will influence the quality of the learning organization (y_n) in a linear and direct proportional manner. Thus, facing with the reality in the x_1 amount will influence the quality of the organization which learns in the amount of y_1 . Therefore, the equation for the relationship between facing with the reality and the quality of the

learning organization will be $f(xn)=yn$ or $f(f(x)=y)=yn$.

4.7 Questioning and Balancing Defense

A majority of administrators have been trained as defensive people. What is needed is blending defense and questioning in a cooperative manner to advance learning. In addition, what is meant here is to express one's own thoughts openly and present these to the test of others. When only defense is carried out, the purpose is to win the argument. When questioning and defense are united, the purpose then becomes finding the best argument and not being superior in the argument (Senge: 2013, 219-221).

As it has been explained above, the purpose is not establishing superiority by the parties on each other, but learning one from another. The balance between questioning and defense makes learning possible. The individual should have the understanding "what and how can I teach the other party" in defense and "what can I learn from the other party by comparing the other party's thoughts and my existing thoughts" in questioning. If both sides defend their point of view a bit more strongly in a reasonable and calm manner, the positions gradually get stricter. Defense made without questioning leads to more defense. In fact, there is an example of a system which defines what happens afterwards and this is called escalation. It has the same structure as armament. The more severely A argues, its threat to B increases in the same amount. As a result, B argues more fervently. Then, A defends its theses in a manner which suppresses B. This goes on and on (Senge, 2013: 220). Administrators find escalation so repulsive that, they avoid openly voicing their different thoughts. Thus, as the intensity of defense increases, the impulse to defend oneself increases in the same amount. The intensity of the other party increases as well and this leads to a vicious cycle; because in only defense, the purpose is to win the arguments. However, in learning organizations, the purpose is to find the reality which will allow learning, accepting or defending it. When this reality is found, learning becomes possible. This vicious cycle is shown by the figure below.



Fig. 9. Escalation Loop

The organizations which participate in this escalation cannot achieve learning. What is important is not one of the parties questioning and defending to win. When escalation is in question, both sides always lose. However, in the balancing of defense and questioning, both sides win. As a result, a single party does not win in the defense and questioning dimension in learning organizations. Through escalation, both parties are balanced. Senge has developed certain principles in balancing questioning and defense. While defending opinions, these are as follows:

- Openly and clearly state your reasoning,
- Encourage others to analyze your views,
- Encourage others to put forward different views,
- Actively question the views of others which are different than yours,

While questioning others, these are:

- If you are making assumptions about the views of others, clearly express these and accept that they are assumptions,

- State the data on which your assumptions are based on,
- If you are really not interested in the replies given by others, do not bother asking questions.

When a deadlock is experienced in the argument:

- Ask the other party what kinds of data or rationality can change their views,
- Ask whether you can arrange a trial which might provide new information together,

If you or others are hesitant about voicing views or trying alternative ideas:

- Encourage others (or yourself) to think aloud about what is making this difficult (What makes open exchange difficult in my or others' behavior?)
- If there is mutual desire, then design other ways of overcoming these barriers with them (Senge, 2013: 222-223).

The above explanations are only ways of obtaining information during the learning process. However, it is inevitable that the above mentioned ones are the methods in mutual learning. The relationship between questioning and defense has been explained in the figure below.

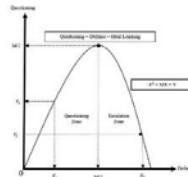


Fig. 10. Questioning and Defense Relation

The figure presents the relationship between defense and questioning as a parabola of two variables. The equation of the parabola curve is $-X^2 + MX = Y$. The variables of this equation have been evaluated as defense = x (Independent variable) and questioning = y (Dependent variable). Or on the contrary, the variables of this equation can be evaluated as defense = y (Dependent variable) and questioning = x (Independent variable); because since defense and questioning will not influence each other simultaneously in learning organizations or since there will be questioning according to defense and defense according to questioning, the place of the variables can change. According to the figure, X_1 defense point is equivalent to Y_1 questioning point and $Y_1 > X_1$. The point in which questioning is higher than defense is until the Questioning=Defense=Ideal Learning Point. The area of the curve upto this point is the questioning zone. In this area, the person who is a member of the organization is not sure about his thoughts. Again in this area, in the questioning of the person who is a member of the organization himself or being questioned by another person, he either cannot state the accuracy of his thoughts and continuously questions himself or is not sure about his thoughts. This questioning being higher than the defense ends at the point where questioning and defense are equal. Upto this point, learning within the organization cannot be productive. According to the figure, the X_2 defense point is the equivalent of Y_2 questioning point. This point is $X_2 > Y_2$. Therefore, the amount of defense is more than questioning. Since defense is more than questioning, as both parties defend their views a bit more strongly in a reasonable and calm manner, the positions become stricter. Defense made without questioning leads to more defense. In fact, there is an example of a system which defines what happens afterwards and this is called escalation. This escalation zone ends in Questioning=Defense=Ideal Learning Point= $M/2$. Again until this point, the learning process of the individual who is a member of the organization is not productive.

Finally, the most efficient and productive point of learning for a person who is a member of the organization is the Questioning=Defense=Ideal Learning Point. At this point, the function of the learning organization is absolute. At this point, the individuals who are members of the organization defend as much as they question or are questioned or question and are questioned as much as they defend. At this point where questioning and defense is balanced, learning for the learning organizations gains meaning.

In the formation of mental models, the agreement or disagreement of the mental models with each other is not important. What is important is that the formed mental models reflect reality. In fact, the formation of mental models which reflect reality will lead to the formation of a single mental model. The whole reality may not be known simultaneously. What is important is that everyone within the learning organization reaches reality in the areas which interest them and form an optimal mental model within themselves. Thus, mental models involved in the formation of reality create a real mental model in general terms. As O'Brien states, "We can all reach different places. The purpose is to reach the best mental model for the person who is in the front line in terms of a specific subject. All of the remaining people focus on helping that person (or people) in making the best possible decision by helping him construct the best possible mental model (Senge:2011,224). The integration of Forming Mental Models and Skills of System Thought can be explained through the figure below:



Fig. 11. System Thinking and Mental Model Relation

Prior to forming mental models, the integration of system thought skills should be the primary concern. System consists of parts before it becomes system. The meaningful relationships of these parts with each other create a hole which makes up the system, through the meaningful role of each variable which plays a part in the system thought. This wholeness initiates the process of forming the mental model and the mental model is thus created. Finally, the mental model is created with the sum of the integration of the skills of system thought and formation of the mental model.

5. Conclusion

As a result, mental models are an inevitable discipline for learning organizations. The deep-rooted assumption in our minds and generalizations influence our point of view of the world. This influence creates an environment which is open to the questioning of the accuracy of deep-rooted assumptions and generalizations through the contingency approach by seeing the variables of events or situations and by making use of the connections between these variables. The questionability of mental models we form through stereotyped thoughts and judgements are a result of our learning within organizations. This learning within organizations plays a great role in the formation of our mental model in the face of events. Learning the variables and their connections within organizations has great contributions to the formation of our mental model. The science of action, abstraction jump, balancing of questioning and defense and mutual questioning which are the variables of mental models increase the quality of forming mental models.

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