

THORNDIKE THEORY AND IT'S APPLICATION IN LEARNING

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Abstract: This article will explain one of theories in learning; that is theory of Thorndike. This theory is developed by education psychology experts from America whose name Edward Lee Thorndike, (Next will be mentioned as Thorndike). Thorndike was born in Williamsburg on 31 August 1874 and died in Montrose, New York, on 10 August 1949. He is prominent figure from Fungsionalism ideology of Columbia. After finished his study in Harvard University, he works in Teacher's College of Columbia under lead of James Mckeen Cattell. Here, his passion to learning process, education and intelligences. On 1898, in his 24 ages, Thorndike published his own books entitled *Animal Intelligence, An Experimental Study of Association Process in Animal*. Thorndike has profession as an educator and Psychologist. Graduated from his first strata from Wesleyen University in Conecticut on 1895, second strata from Harvard on 1896 and seize his doctor degree in Colombia on 1898. He published some books such as: *Educational Psychology* (1903), *Mental and social Measurements* (1904), *Animal Intelligence* (1911), *A teacher's Word Book* (1921), *Your City* (1939), dan *Human Nature and The Social Order* (1940)¹. And it will explain such as: Explaining law of learning based on Thorndike, explaining how learning principle of Thorndike in learning process, explaining application of Thorndike theory in learning, and giving an analysis to Thorndike theory

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¹ Sarlito Wirawan, *Berkenalan dengan Aliran – Aliran dan Tokoh-Tokoh Psikologi*, Jakarta: Bulan Bintang, 1978, Hal 113

BACKGROUND OF STUDY

Profession needs a basic of theoretical framework in supporting a practice. Education profession that has learning process contains a theoretical framework that is relied on a result of empirical process. The relation between theory and practice is so close that can generate scientific study especially in education area.

Theory is composed from construction process, principle and proportion that empower science treasure, while, practice is an application in solving real problem in activity of profession. Practice also gives a contribution to theoretical framework through the information that is acquired in empirical process. Realization of learning process is to relate theory and its implication through practice concretely.

Theory is an abstract concept from the result of empirical process which will be generalized. Theory is included in resume of statement that describes and arranges an empirical observation. Then, this formulation is used as a basic to develop a science, meanwhile learning contains a concept that is a change is relative permanent or potential behavior as a result of experience.²

Thorndike Theory

One of the phenomenal work is his book under title “*Animal intelligence, An experimental study of association process in Animal*”. This book is based on his research to behavior of animals like cats, dogs, and bird. According to him, the behavior of those animal is giving a description of learning process; that is basic of learning is association, a stimulus will result generate a certain respond. Thorndike theory explains learning is change of behavior that can be observed, measured, and assessed concretely. The change of stimulus will generate respond based on mechanistic law.

Based on Thorndike, learning is phenomenon that grows associations between one events to another events which is called as stimulus (S) with respond (R). Stimulus is a changing of external environment that become sign to activate organism to react and act. And, respond is behavior that is raised by stimulus.

From experiment of hunger cat which is putted in cage is known that in order to reach relation between stimulus and respond need an ability to choose precious respond through trials and errors. Here, some experts call Thorndike as *Instrumental Conditioning*.

And the basic of learning is “*trial and error learning or selecting and connecting learning*”. Therefore, learning theory which is said by Thorndike is

² Hergenhahn, B.R. & H Olson Matthew. 1997. *An Introduction to Theories of Learning*. Fifth Edition. New York: Prentice Hall, Inc. Pg. 6

often called as *connectionism or association theory*. Because of this contribution, Thorndike is known as pioneer in education psychology³.

One of the famous of Thorndike experiments is hunger cats is putted in the cage which have automatic door, it can be open and close if button which is located under cage is touched. In stage of trials, cat tends to leave a unresolved behavior. Every respond makes a new stimulus, then this new stimulus will make another respond, and it will happen repeatedly. It can be described as this scheme:



In this experiment, if out of cage is putted a food, then cat will try to reach it. Suddenly, the cat touch the button of the cage, then the door will be open, and cat will run out and eat the food. This experiment will be repeatedly did until ten till twelve times, then the cat will touch the button deliberately if there is food outside of cage.

Thorndike uses this experiment repeatedly to same cat and same situation. Firstly cat only go around a cage and try to escape from the cage. A trial of escaping from the cat is a respond from the stimulus; that is food. Finally, the cat will find a match respond (escaping) with the stimulus (getting the food out side the cage).

Thorndike said his theory in learning that every creature in his behavior there is a correlation between stimulus and respond. In this theory also said that person who master relations between stimulus and respond is person who is succeed in his learning. And the way to build a relation between stimuli and respond is done frequently.⁴

In the theory of *trial and error*, is occurred to all organism and if this organism is faced to new condition and situation, so this will be automatically give new respond (trial), because basicly in every stimulus will be found a respond. If those action need to produce a behavior or suitable action, then this action will be saved in other mind of another organism. Therefore, the theory of trial and errors will generate other respond to other stimulus and it will occur repeatedly.

³ Tohirin, *Psikologi Pembelajaran PAI*, Jakarta;Rajagrafindo, 2005, Pg. 62-64

⁴ Sarlito Wirawan, *Ibid*, Pg. 114

Law of Learning in Thorndike Theory

In discussing law of learning of Thorndike, there are three main concepts; those are *Law of Readiness*), *Law of Exercise* and *Law of Effect*.⁵

Firstly is law of readiness, in this law learner must be ready and in good condition in order to be successful in his learning. Readiness here must be in psychology and physically. Ready in physics means learner is not in sick condition, and ready in psychology means learner does not have mental sickness and other. Besides, learner must be ready in mastering a science and its basic competence.

Based on Thorndike, there are some conditions that appear in this law such as: *first*, if there is a preference to act and people want to do it, they will be satisfied. In consequence, they will do not act other behavior, and it will result unsatisfied. Second, if there is inclination to act, but people do not want to do that, they will replace with other action to lack of their unsatisfied. And, third if there is no tendency to act, but people are forced to do that, it will result unsatisfied.⁶

Law of readiness has an implication that every organism acquires changing of behavior, and in its implication of this behavior result a satisfaction, then the association will be strengthened. This connectionism theory⁷ states that learning is an activity that forms association or connection between an impression of five senses and tends to act., for example person who likes to cook, then he or she will do that thing, and if he or she does that, he or she will feel satisfied and happy⁸.

Second is law of exercise. To result suitable and satisfied to respond stimulus, so person should trials and practice frequently. And suitable and satisfied action can be acquired in learning. And the trials behavior is an existence of improvement behavior to make the behavior stronger. And to make them remembered by long term memory of person, he or she should repeatedly do an action to record the behavior to short term memory and it will be continued to long term memory.

According to Thorndike the main principle of learning is repetition, because of that teacher who gives a question (Stimulus) the students will answer it (Respond), and make the prestige of student increase. Thorndike states that repetition without reward is not effective, because association of stimulus and respond can be strengthened through reward.⁹ So, in this law exercise of behavior will direct to amount of repetition which is known as *drill*. Principle of *law of*

⁵ C. George Boeree, *Sejarah Psikologi dari Masa Kelahiran Sampai Masa Modern*, Yogyakarta; Prisma Sophie, 2005 Pg. 389 - 391

⁶ Hergenhahn, B.R. & H Olson Matthew. 1997. *An Introduction to Theories of Learning*. Fifth Edition. New York: Prentice Hall, Inc. Pg. 70

⁷ Sumadi Suryabrata, *Psikologi Pendidikan*, Rajawali Pers, Jakarta, 1987, Pg. 172

⁸ Umar Tirtaraharja & S.L. La Sulo, *Pengantar Pendidikan*, Jakarta :Rineka Cipta, 1995, Pg.195

⁹ Oemar Hamalik, *Psikologi Belajar dan Mengajar*, Sinar Baru Algensindo, Jakarta, Pg. 2000

exercise is connection between condition and action which can be strong by doing exercises, but it will be weak if the connection between both of them is stopped.

In this case, exercises contain two things. First is The Law of Use; that is connections between condition and action can be strong if there is an exercise. Second is The Law of Disuse; that is connections between condition and action can be weak if the exercise is stopped¹⁰.

The third law is law of effect. Every organism, has own respond in facing a new stimulus and new situation. If organism determines a respond or action that possesses a satisfaction to that organism in facing the new situation and condition, they will do the same action if later they face same situation and condition. Meanwhile, behavior which do not possesses satisfaction in facing the new situation, this action will be abandoned forever by the organism. This thing will be occurred to all organisms automatically.

Thorndike states that organism as a mechanist that will react if there is a stimulus dan situation which affect them. In education area, law of effect is happened to someones who gives *punishment* or *reward*¹¹. However, in education the thing that can give the reward will be more effective than a punishment. Thorndike theory actually is state as connectionism theory because in learning, this theory more emphasize to “Law of Effect” which state that connection between stimulus and respond can product an effect. Thorndike believes that the process of animal’s learning is same with the human’s learning, although the relation between situation and action (behavior) of animal is without an understanding. Animal do the respond directly from what they observed mechanically.

This law shows that if the connection or relation can be modified like relation between stimulus and respond and that relation can be followed by the expected event in order to make the relation much stronger. In contrast, if the unexpected event happen, it will the relation can be weak.

Connection between five sense and tendency to act is based on the result. For example, the teacher who motivate and give reward to students who do a homework, that students will happily do the homework, but, if the teacher always give a punishment to student, probability students will be lazy to do the homework.

Next, Thorndike adds some additional laws such as:¹²

1. Law of multiple responses. This law state that every individual is begun by trial and error process that show kinds of response before the individual finds right response to overcome the problem.

¹⁰ Sarlito Wirawawan, *Ibid*, Pg. 115

¹¹ Sumadi Suryabrata, *Op Cit*, Pg. 271

¹² C. George Boeree, *ibid*,

2. Attitude law. This law explains that learning behavior of persons is not only decided by the relation of stimulus and response, but also decided by their condition either their cognitive, emotion, social or psychomotor.
3. Prepotency of element law. This law states that persons who are in learning process give a respond to the current stimulus that suits with their perception to whole situation and it is called by selective respond.
4. Respond by Analogy law. This law asserts that persons are able to do a respond to the situation that is never happened before because the persons can connect that situation to old situation, until there is a element transfer from old situation to new situation.
5. Associative Shifting law. This law clarifies that process of shifting from known situation to unknown situation can done gradually by adding the advantage element and delete the non advantage element.¹³

Then, there is a revision in learning which is explained by Thorndike such as:

1. The law of practice is abandoned because it is found that repetition is not adequate to strengthen the relation between stimuli and respond. Meanwhile, without repetition, the connection between stimulus and respond can not be weak.
2. The law of effect is revised. As said by Thorndike that something positive that can affect behavior is reward, not a punishment.
3. The main requirement to make stimulus and respond is not nearness, but appropriateness between stimulus and respond.
4. The effect of action can infect to other area or individual¹⁴.
5. Here also said that connectionism theory also shows that concept of *transfer of training* that is skill which is acquired from learning can be used to overcome the other problem. This theory is developed based on the experiment to the cat with its box problem.

¹³ Hergentan & Mathew Olson, *Ibid*, Hal 62 - 69

¹⁴ *Ibid*

Application of Thorndike theory to students learning

The things that must be considered in implicating Thorndike theory is the strong character serve as a basis; those are:¹⁵ advance of environment's effect, emphasize detail parts, emphasize role of reaction., consider important mechanism how stimulus and respond build a learning result, emphasize to role of previous ability acquirement, advance build a habitual through training (exercise), repetition and expected learning result.

In Thorndike theory learning is oriented to result that can measured and observed, an error must be fixed immediately, and repetition and exercise is used to make the behavior become a habit. Result in application of behaviorist theory is forming an expected behavior which the expected behavior can be strengthened positively. And unexpected behavior can be deleted. In this case, evaluation and assessment are based in the appearing behavior.¹⁶

The application of Thorndike behaviorist theory that is wrong in learning situation can cause uncomforted learning to student like teacher as central, authoritative, communicate in one way, and teacher determine what students should learns. In this situation, students are passive, need a motivation from the outside and much affected by the teacher. Students should listen carefully the explanation of the teacher and memorize what they learn, and this learning is seen as effective ways in teaching learning process. The used of punishment which is evaded in learning, behaviorist expert precisely use it as most effective ways to discipline the students.

Application of Thorndike theory in learning consists of a practice value in learning procedure like: first, before teacher starts to teach in class, students should be prepared in mental firstly. Second, teachers do a regular test or exercise or drilling system. And third, teachers give supervising, reward and praise to grow strategic effect for students¹⁷.

As a consequence for this theory, teacher should has behaviorism paradigm to arrange a lesson material in order the purpose of learning can be mastered by students. Teacher should not give a lecturing, but short and clear instruction which is followed by good example. The lesson material is arranged hierarchically from simple one to the complex one. The purpose of learning is divided into small parts which are signed by accomplishment of specific skill.

This Thorndike method is suitable with the acquirement that needs practice and habitation contain element like: acceleration, spontaneity, reflex, endurance and other. For example the conversation of foreign language, typing, dancing, computing, swimming, sport and etc. This theory is suitable for children which

¹⁵ B. Simandjuntak dan IL. Pasaribu, *Psikologi Perkembangan*, Tarsito, Bandung. 1981, Pg. 194

¹⁶ Dimiyati & Mujiono, *Belajar dan Pembelajaran*, Jakarta; Rineka Cipta, 1994, Pg. 19-20

¹⁷ *ibid*

need dominances from the adult's role like imitating, habituating, and direct reward.

Critical Analysis to Thorndike Theory

Every theory and method in scientific study has an excessive and lack. That thing also happens to theory of Thorndike. Some of lack in this theory can be shown like:

Firstly, in this theory Thorndike use animal as experiment (cat, dog, and etc). in educational study this thing is considered as controversial thing by education expert, because the learning of animal skill is different. The skill which is acquired by the animal is called by *dressur*. Principally, animals do not have education concept and learning because animals only use its instinct. So that, there are many experts reject Thorndike theory because compared the learning with animal¹⁸.

Secondly, Thorndike theory see human as mechanism that have similarities with animal. Although, some of mechanism of human is automatic like animal, but it is not always affected by trials and error process. *Trial and error* can not effect to human absolutely.

Third, this theory sees learning as association between stimulus and respond. Till, the most emphasize thing in learning based on this theory is strengthen the association by exercise repeatedly. This case does not give a chance to raise a logical reasoning which can dig more meaning outside the associate thing.¹⁹

Fourth, because learning is seen as mechanistic system, the definition is not considered as important thing in learning. This theory ignores the definition as a main element in learning.

Fifth, implication of this theory in learning process is seen not giving to learner to create, experiment, and develop their own ability,²⁰ because this learning system has character automatic-mechanic in combining stimulus and respond like machine or robot. In a result, learner is lack to develop their potency.

Sixth, this theory believes that learner as passive object that always need motivation and reinforcement from educator. By that, educator develop structured curriculum by used certain standard in learning process which must be reached by learner. And, also in evaluation, learner is measured from appearing thing, while the abstract one is not considered in evaluation.

Seventh, learning is most related to discipline. Failure or disability in acquiring science is categorized as a mistake or error that must be punished and

¹⁸ Ngalim Purwanto, *Ilmu Pendidikan; Teoritis dan Praktis*, Jakarta: Rajawali Grafindi, 1995 Pg. 6-10

¹⁹ Abu Ahmadi & Nur Uhbiyati, *Ilmu Pendidikan*, Jakarta: Rineka Cipta, 2001 Pg. 1-57

²⁰ B. Simandjuntak dan IL. Pasaribu, op.cit, Pg. 197

the successful of learning is categorized as good behavior and appropriate to get a reward. And also students who obey the rule will be considered as a successful of learning, and so in contrast, until the control of learning must be stacked on system outside of learner.

Eighth, the delivery of lesson material emphasizes to isolated skill and fact accumulation which is followed the hierarchy in whole. Learning follows the arrangement of curriculum tightly, till the activity of learning is based on the text books. Then, the students should be able to express the containing of textbook back. Learning and evaluation advance to the result of learning, not a process.

Ninth, evaluation stress to passive response, and usually use a written test. In this evaluation, learner is demanded to answer correctly based on the expectation. If learner can reach the expectation, learner will be considered as successful learner. And in this evaluation learner is seen as separated part from learning activity because this theory stress on evaluation to learner ability individually.

Conclusion

The main principle of Thorndike theory is learning is exercise repeatedly, because of that learning must be oriented to give exercise as stimulus, so that learner can give a respond for that stimulus. And hopefully, by doing those thing, the prestige and ability of student can be increased. Thorndike states that in learning is process between stimulus and respond. This theory have three main concept those are Law of Readiness Law of Exercise) and Law of Effect.

In journey of his thought about this theory, Thorndike adds some law in his theory and modifies some of element in it. Beside, in implementing his theory, some of teacher should consider something such as, how the law work in learning process and how to apply it well.

Finally, although the theory of Thorndike is great and can give contribution in learning process, but there is also some critic to its theory such as this theory believes that learner as passive object that always need motivation and reinforcement from educator. By that, educator develop structured curriculum by used certain standard in learning process which must be reached by learner. And, also in evaluation, learner is measured from appearing thing, while the abstract one is not considered in evaluation, and etc.

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