

## ON THE COMPLEMENTARINESS OF THE LEARNING THEORIES AND THEIR RELEVANCE FOR STREAMLINING THE EDUCATIONAL PROCESS

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### Abstract

There is a visibly noticeable discrepancy between the many psychological studies which have as their object the learning process and the valorisation of the study outcomes in the theory and practice of teaching. Therefore, when the psychologists highlight the various features of the learning process, with consideration of this fact it is necessary to involve immediately a transposition of this feature into a pedagogical research plan, realizing precisely this rapid evolution of the research on learning theories on one hand, and the need to make this evolution known, on the other hand. The authors of this study wanted to make a synthesis and a presentation of the field as it looks today; thus, classical theories are represented in terms of completions brought by the recent research conducted by cognitive psychologists. Nevertheless, the authors could not avoid the temptation of making a simple overview of learning theories, as one of the major objectives of this study was represented by the implications and importance of research on the learning process for streamlining the educational process.

**Keywords:** *educational process, learning theories, teaching, streamlining.*

Psychologists and pedagogists have always shared a common interest for understanding and streamlining the learning process within a real context. For both categories, the learning process is one of the most important processes that define and model the human being. Unfortunately, psychologists and pedagogists have not always known how to communicate the results of their respective research to each other. This was mainly due to the fact that psychologists focused on the basic mental and behavioural aspects of the learning process, while pedagogists have been interested in the concrete aspects of streamlining the educational act within the real framework of the teacher–student relationship, in the classroom and in the more general context of the school. Hence, for a very long time

pedagogists (especially the humanities-oriented ones) refused to believe that the experiments on animals below the evolution of anthropoids could be relevant at all to understand the specific learning ways of humans.

Recently, we have noticed a more sustained effort to integrate the significant results obtained by researchers with various orientations in the complex field of learning. Theoreticians such as Ken Wilber – who coined the concept of “transformative learning” – define their views as metatheoretical and they present them as more balanced, comprehensive, and inclusive (Gunnlaugson, 2005). Today, there is almost no theoretical approach of the learning process without the mention that it represents synthesized theories that will provide a unified framework for the understanding of the various standpoints expressed in the field of learning (Artemeva, 2008).

In addition, important groups of researchers animated by the same ideas (such as Design-Based Research Collective) propose explicitly to create “bridges” between the educational theory and practice (Design-Based Research Collective, 2003). By adhering to these unifying trends, the authors of this study start from the same idea of the compatibility and complementariness of all studies who have been dealing with deciphering the mysteries of learning and they will try to bring pertinent arguments to support this idea.

Among the first essential contributions to the scientific research of the learning process it is worth mentioning (as it is well known), those brought by the Behaviourist school, starting with Thorndike. This researcher was not a behaviourist *per se*, considering that he often had controversies

with the behaviourists on concepts such as impulse, pleasure–displeasure, state of readiness, etc., which the behaviourists labelled as mentalist. However, with time, Thorndike gradually assimilated, to the Behaviourist school because of the important influence of his research on the subsequent evolution of this current.

The seemingly simple experiments conducted by Thorndike (similar to those of Pavlov) have led to major discoveries. First, his conclusion that learning is based on proper reward (though subsequently criticized) allowed the re-assessment of certain wrong educational practices. More precisely, for a long time, the dominant idea was that “repetition is the mother of all learning”; in fact, even today, many of those involved within the educational process still believe in this classical formula, seen as absolute truth. Thorndike’s research allowed a scientific-based rejection of this classical view.

Thorndike did not deny the importance of repetition, but (just like in the case of the famous experiments conducted by Ebbinghaus, which pinpointed the fragility and inefficacy of memorisation by mechanical repetition) he has proved that repetition is efficient only if subordinated to reward-based learning. This way, “the mother of all learning” becomes, in the view of the American psychologist, the reward; in addition, repetition is a simple subordinate method which consolidates learning. The trial and error law of learning thus becomes a principle, while the law of repetition becomes a secondary law, subordinate to the principle.

Another discovery (maybe equally important) was the one related to the proper understanding of the role of punishment in learning. The equally classical idea that “habit cures habit” has proven its limits, at least insofar as it refers to its application through punishments. One of Thorndike’s experiments (derived from his main experiment) proves beyond doubt that the application of punishment after learning does not lead to forgetting or to losing the habit, but it only determines the emergence of new behaviours meant to avoid punishment. And if these new attempts lead to a new connection, it is not due to the punishment, but to a new reward. The myth of the effectiveness of punitive learning methods (so intensely used and praised

by certain teachers in the past) was thus demolished with experimental methods, as early as the beginning of the twentieth century (Thorndike, 1983).

These discoveries of the psychologist Thorndike (with direct applicability in the educational space) were completed by another one, which has influenced the behaviourists’ research in global terms. The theory of identical elements, developed by Thorndike, states that the learning process does not always have to be carried out integrally, as it would take too many resources. This is why, if there are enough identical or similar elements, the learning acquired in a similar situation can be spontaneously re-activated and extended to the new situation. Considering that the learning process is only rarely carried out in entirely new circumstances, the theory of identical elements has helped the behaviourists explain the potential rapidity of our learning and the way in which previous experience is used in the acquisition process of our behaviours, (Hilgard & Bower, 1974).

Hence, it is anything but surprising that Thorndike’s connectionism theory dominated for almost half a century the field of educational psychology and more. Moreover, despite all the criticism brought to this theory, none suggested that Thorndike’s interpretations were wrong, but only that learning does not always occur following the methods researched by the important psychologist.

Inspired, among others, by the ingenious methods used by Texan farmers to tame horses, Guthrie (one of the important behaviourist psychologists) developed a learning theory in seeming contradiction with Thorndike’s. He considered (by interpreting the results of his own experiments) that learning does not involve a process, but that it occurs spontaneously. Learning viewed as largely a stereotypical, spontaneous act was a very unusual statement for that time. Only later did cognitive psychologists bring more evidence to support this thesis, but using other arguments, to which the behaviourist Guthrie would have never agreed. According to Guthrie’s theory, our behaviour can be decomposed into “atoms” which he called movements. Movements are made, in their turn, by the two basic elements

present in any self-respecting behaviourist theory: the stimulus (S) and the response (R). The most important statement about movement is that there is no temporal “distance” between its components (S and R) because they appear spontaneously, instantaneously. The direct consequence of this fact is that learning itself becomes spontaneous, immediate. However, next Guthrie had to explain how he can reach an agreement between his statement that learning is direct (that it requires no effort) and the crystal clear conclusion that learning requires, actually, a long time to be performed optimally.

The answer of the behaviourist psychologist is that learning is spontaneous only on the level of the smallest elements, the movements. On a higher level, we develop rituals and things get complicated. Many times, non-adapted habits emerge, which have to be eliminated, their elimination makes the learning process loaded and complicated. The conflict between the old, non-adapted habits and the new ones will be decided, in Guthrie’s opinion, by reward. While it is true that for him reward no longer creates learning, it is still the decisive element in the selection of proper habits (Hilgard & Bower, 1974).

The importance of Guthrie’s theory comes from his warning towards the persons involved in the educational process, regarding the correct teaching of the first habits. According to Guthrie’s research, it is much harder and pricier to correct what you learned wrong than to try to learn it well from the beginning.

One of the most influential behaviourist theories – B. F. Skinner stated that organisms produce behaviours spontaneously. Reward (always situated outside, in the life environment) is the main modelling factor of the behaviour, the determining stimulus, responsible for the effectiveness of learning. Skinner (an admirer of Pavlov, from whom he copied the simplicity and efficacy of the method) is the most important and influential psychologist in the opinion of many psychologists.

According to Skinner, we move in the surrounding environment guided by discrimination stimuli which directs our searching effort toward something that can turn into a reward. Unlike Thorndike’s theory, which

mandatorily implied the presence of an initial determining stimulus (such as hunger, thirst, etc.), Skinner’s theory starts from the fact that the organism freely produces behaviours, but that only the ones awarded by the environment get to survive. Skinner’s theory is connectionist, too, as learning does not occur spontaneously, but gradually, within a process; however, in the opinion of the great psychologist, the connection is reversed and the behaviour transforms from a passive into an operant behaviour (Skinner, 1971).

Even today, the principles of scheduled learning based on levels of complexity are the grounds of most learning-without-teacher programs, thus proving the modelling force of reward-based behaviours. Furthermore, many psychologists today share the same optimism, based on Skinner’s experiments, related to the belief that the human being can become better if the society we live in betters and becomes more responsible (Ross & Nisbett, 1991).

The influence of Skinner’s learning theory was so significant and the efficacy of his modelling method was so persuading, that only a few dared to contest its principles. This is why, when an obscure Mexican-born American called Garcia stated that learning does not require immediate reward, the zealous disciples of Skinner immediately accused him of falsifying the results of his own experiment.

In fact, Garcia discovered the effect with the same name by accident., as he had to resolve an irreconcilable conflict between the coyotes that killed the animals of Texan farmers and the latter, who hunted them mercilessly, this psychologist used a substance that produced strong reactions on the level of the digestive system and he used it on several sacrificed sheep. Garcia hoped that, after ingesting the meat impregnated with this substance, the coyotes would stop hunting the animals, as the meat would cause them physical discomfort.

The declared purpose of the experiment was not reached, given that the coyotes, though they did stop consuming the meat of their victims, they kept on killing the animals, following their hunter instincts. However, on this occasion, Garcia discovered that behaviour modelling could succeed despite a long temporal gap between the application of the negative

behavioural conditioning and the presence of the effects. More precisely, though many hours passed from ingesting the substance until the onset of organic symptoms, the coyotes still made the connection between the ingested meat and these symptoms, and this connection made them avoid the meat which had produced the discomfort (Leonard, 2002).

Garcia's discovery called into question the principle coined by Skinner (the mandatory character of immediate reward for successful learning). Actually, the principle states as follows: if there is no immediate reward after the appearance of the response, there is no learning. On the contrary, Garcia highlighted the existence of a potential organic memory; responsible for creating remote connections...this was unconceivable for Skinner and his followers. However, despite these oppositions, subsequent research confirmed Garcia's discovery; hence, the learning process acquired a new form of expression, called "the Garcia effect" (or conditioned taste aversion).

Later on, Bernstein I. demonstrated that the Garcia effect also applies to the situation of children suffering from cancer. In their case, the excessive care of the adults to feed them as well as possible right before the excruciating chemotherapy procedures invariably leads to an aversion toward those foods, associated with pain; this leads to weight loss and to a weakened body, less able to fight the disease (Hergenhahn & Olson, 1993).

Other followers of Skinner made sure to temper Bernstein's optimism regarding the unlimited possibilities brought by behaviour modelling. It is worth mentioning here the case of the Breland spouses, who tried to model the behaviour of many animals that had to appear in various Hollywood movies. They discovered serious limitations imposed by the species of the animal whose behaviour one wanted to model. Regardless of the researchers' insistence on a non-specific behaviour, the reward proved to be totally ineffective in this case. The conclusion of these researchers was that behavioural modelling through reward was effective only within the limits necessarily set by the behavioural "baggage" of the species.

David Premack took the entire issue a step further. His theory starts from a conclusion of the psychological common sense; more precisely, people intuitively know they can ask someone a small sacrifice if they can promise that someone a greater reward later. This way, Premack's principle completes and enriches the Garcia effect. Not only is it possible for one to emit behaviours for a reward that does not come right away (as suggested by the Garcia effect), however we could accept sanctions or even punishments, if they are less significant than the subsequent reward.

Premack's view has a special importance considering that, up until him, everybody discussed only the multiple ways in which reward dominates the learning process. Until he came along, punishment had only been meant to trigger new behaviours in order to avoid the displeasure brought about by it. Now, in Premack's opinion, sanction becomes part of the learning process, with a direct contribution to it. Reward and punishment are no longer in an irreconcilable opposition, but one of them (punishment) is directly subordinated to the other (to reward), (Schunk, 2008).

Furthermore, in order to understand better the role of reward within learning, another experiment outlines a different perspective on it. Some chimpanzees were given several simple puzzles to solve. There was no reward for it, but the chimpanzees were very interested in the process. The change occurred when the chimpanzees were offered raisins right after they managed to solve a puzzle. Researchers noticed that the chimpanzees lost their interest in solving the puzzles after this intervention of the experimenters.

This experiment has a special explanatory value; it proves, for the first time, not only that reward is limited, but that it can also have negative, unwanted consequences under certain circumstances. This way, after Premack showed that the devil is not as black as he is painted and that sanction could have a stimulating role in learning if it is cleverly subordinated to reward, this experiment shows that over-rewarding can be counterproductive if there had already existed an intrinsic motivation. The reward inappropriately applied under these circumstances cancels the intrinsic motivation

for learning and it turns it into extrinsic motivation (Hergenhahn & Olson, 1993).

Premack's view on learning is in accord with that of Tolman; the latter is considered the first cognitive-oriented psychologist of learning. Influenced by the principles of Gestalt psychology, Tolman pinpoints that classical behaviourism is wrong when considering the learning process simplistically, in terms of Stimulus-Response. In Tolman's opinion, this process is much more complicated, as intermediate variables exist between stimulus and response. In other words, our behaviour is guided by intentionality, by expectations; it is purpose-oriented, molar, complex, and not a collection of molecular habits (Hilgard & Bower, 1974).

The ingenious experiments conducted by Tolman have represented a model for the subsequent research. It is worth mentioning especially the experiment which underlined that, in a labyrinth, rats do not act chaotically, on a trial-and-error basis, but that they have an integrated behaviour, guided by complex action schemes. This experiment is in agreement with the research conducted by Jean Piaget, the creator of genetic epistemology, who underlines that children's play (a complex form of behaviour) is coordinated by cognitive schemes that the child internalizes as he develops.

Just like the Breland spouses, Jean Piaget highlights that learning can only be done within certain limits. The difference is that, while the first emphasized only on the limits of learning depending on the characteristics of the species, Piaget states that there are also limitations that we cannot overcome within the age-base evolution, as each age allows certain types of learning, while other types may be ineffective. It is well-known that, in the opinion of the Swiss psychologist, each development stage of the child supposes a certain type of learning, grounded on a particular type of cognitive structure and of schemes involved in the process. Only after completing all the accumulations required by the specifics of each stage of cognitive development can one pass to a higher level, where other learning principles operate.

Besides the view of J. Bruner, J. Piaget's theory is considered as part of the constructivist theories. In the psychological theory of learning,

constructivism emphasizes the independence of the educated person, on his dynamism and, mostly, on his active involvement in the learning process. Bruner used to state that, even in case of children with certain intellectual issues, learning is made easier if the educator manages to explain very well what he wants from those he educates.

Albert Bandura underlined another face of the complex learning process. A theory on the importance of limitation (as fundamental interpersonal characteristic) was developed since the nineteenth century by the French sociologist Gabriel Tarde. This sociologist believes that the imitation phenomenon occurs on the level of both the conscious and the unconscious. However, Bandura rigorously demonstrated the importance of imitation through experiments. Bandura pinpoints that man is a social being, dependent on the others, this being a reason for which much of what he learns comes from observing the behaviours of those around him. Actually, we learn the most by observing those whom we see as models, who have a significant influence upon us.

Bandura's major interest was the transmission of aggressive behaviour through imitation, and the "Bobo doll" experiment made him famous. Through this experiment, he proved that the child did not need a reward in order to imitate an adult's aggressive behaviour toward a doll. The mere fact that adults become behavioural models for children is enough to stimulate the learning process. Furthermore, imitation through observation proves important mostly when the adult who is aggressive to the doll gets a reward. In this case, it is proven that the reward does not necessarily have to be delivered directly and personally, as Skinner claimed, but it can also prove powerful in terms of social imitation through observation (Bandura, 1986).

Hence, by accepting the influence of the others on our behaviours, Bandura's theory became a social theory of learning, and by accepting the interference of cognitive processes such as the perception of others, the imagination, the self-control, etc., his theory became socio-cognitive. Moreover, in time his theory became ever more far-reaching. Concepts such as self-regulation, self-reflection, beliefs on self-sufficiency, and

even moral values made Bandura's theory on learning become full of humanism, too.

Under these circumstances, his triadic reciprocal causation regarding the modelling of human personality draws attention on the fact that the influence of the environment is not enough, nor that of our own inner impulses to make learning efficient. We necessarily need a third determining factor, involving control and self-control, as well as a correct perception of our self-sufficiency in order to be well inserted and adjusted to our social setting. With such a complex theory that proposes to offer solutions even to cure some of the dysfunctions of our psyche (ex. phobias, posttraumatic stress disorder, etc.), one should not find it surprising that Bandura became one of the most cited psychologists of all times (Hergenhahn & Olson, 1993).

We said earlier that Bandura's theory has evolved significantly in the territory of humanism within the past years. Another important humanist concerned with the learning process was Carl Rogers. His model - "student-centred learning" - derives directly from and it is grounded on his broader view on the "client-centred therapy". There is an important difference, but also similarities exist between the theory of Bandura and that of Carl Rogers. First, Rogers does not agree that learning through imitation is as valuable as claimed by Bandura. From the perspective of his theory, nobody can learn directly from someone else's experience (Rogers, 1969). If what we learn is not directly lived by us, if we do not make it pass through the filter of our own experience, then learning is not effective, authentic. In the teacher-student relationship, the student is the one who should get most of the attention, as the experiential baggage with which he comes to the classroom is the important thing in this case. Depending on this baggage, he can start and develop his adventure in the realm of learning (Rogers, 2008).

However, as Bandura's theory re-assessed the role of imitation (by reducing its importance), passing through cognitivism toward humanism, the theories of the two great theoreticians of learning became very similar. By emphasizing on the personal beliefs related to self-sufficiency, Bandura also ended up supporting the idea that

one's own attitudes and beliefs are first-rank mediators within the learning process.

Mezirow's theory, which underlines the importance of transformative learning, is one of the high-impact theories in the current research. This theory is part of the cognitive theories that highlight the importance of personality constructs (Kelly, G.), of schemes (Tolman, E.), of self-sufficiency beliefs (Bandura, A.), etc. However, the specific of this theory is the significant focus on the contribution brought by consciousness, by rationality in the learning process. Mezirow believes that, through transformative learning, man can take control over his own unconscious, (Mezirow, 1997; Gunnlaugson, 2005; Kitchenham, 2008).

Transformative learning, as a process of conquest by the consciousness of new territories in the field of the unconscious, has received serious criticism. It has been criticised first because of Mezirow's emphasis on rational processes; ironically, the cognitive psychologists of learning were the ones who criticised it. Nonetheless, the criticism against Mezirow is explainable if one takes into account the fact that, for the most part, cognitive psychologists pinpoint that the most important cognitive processes involved within the learning process take place on the level of the unconscious (Illeris, 2009). An entire manifesto paper of Bargh J. is dedicated to the idea of automatism in the daily life and in learning, and it even states that only 1% of our cognitive activity takes place on the level of the consciousness. Hence, the belief of the common person that through cognitivism we get to understand the rational, conscious processes is wrong; actually, things occur the other way around (Bargh, 1997).

If we consider each of the above-represented learning theories separately, according to the statements of each author, we can easily conclude that these theories are in some sort of competition with each other. Actually, what we believe that we made clear along the presentation is precisely the complementariness of these theories on learning. Far from contradicting each other, they complete each other. It is very clear for anyone who becomes interested in the learning phenomenon that this psychological process is extremely hard to identify; it is

multi-faced, polymorphic, and well-structured on complexity levels.

Concretely, we can focus, together with the classical behaviourists, on the most atomist level possible, on the level of the simplest behavioural acts, and we can follow their evolution through aggregation toward the higher level of habits, complex skills, or rituals. On these levels, learning is expressed through trial-and-error, spontaneity, through the connection performed by external stimulation. On the immediate higher levels, intermediate elements with an indisputable cognitive component (such as expectations, schemes, or personality constructs) complicate a process that did not seem very simple to begin with. Finally, on the level of higher personality structures (those which the humanists place at the top of the pyramid) there are the most elaborate and important human beliefs and values that guide our learning effort.

The lesson taught by the theoreticians of learning is that, regardless of the level on which we approach the learning process, we may not neglect, nor exaggerate the role of the phases or of the components of this process. Reward, sanction, or any other cognitive component alone cannot explain this process, as it encompasses enough mysteries to set off the interest of the researchers today, both psychologists and pedagogists. It suffices to show that new researches aim to get a very direct view of the mysteries related to neurological processes which get activated during the learning process, within the concrete framework of the classroom. Hence, today the contribution of the neuro-educational sciences to the understanding of the learning process is very important. And, again, we can reiterate what we have stated at the beginning of the article: there is a trend among entire collectives of researchers to organize in order to create a more powerful connection

between theory and practice in the field of learning.

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