

Application of Information Conservation Law in Teaching

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Abstract: In connection with cardinal changes in the system of education, which is connected, on the one hand, with informatization of the education and, on the other hand, with introduction of new educational standards, there is a requirement to provide the educational system with experts, who are capable quickly to adapt for various external conditions. This paper considers the application of information conservation law in the educational process. The information conservation law is presented in three characteristics: novelty, succession. Requirements of implementation of the information conservation law are listed.

Key words: Education • Informatization • Conservation law.

INTRODUCTION

The problem of training future teachers to professional activity is very urgent nowadays, when scientific and technical progress and intensification of the material, social and spiritual life of the community raises a high demand to the educational system as well as its subjects [1].

As it was presented in studies of some scientists [2-5] performed in various countries of the world, it is necessary to develop methods of teaching, to search ways of environment forming favoring to the achievement of maximal efficient result.

The process of training, which proceeds in time and space, laws of time, space and causation, may be used for effective teaching. Training and trained persons are the subjects of the educational process. The personality of the man tells about the fact that he actively participates in the transformation of the environmental validity, he himself chooses the methods, means of training and uses them, i.e. the trained person by receiving the information from the teacher at a lesson should conserve it. The percentage of the information conservation (quality, quantity of conservation) *depends on the aware-need activity of this trainee*, but not implemented pedagogical technology by the teacher. The question here arises: "Can the trained person conserve the received information, if he does not have any idea about what pedagogical technologies the teacher uses in relation to his development? If he does not have any idea how to apply conservation methods in his mind?"

Arising problem: the teacher knows how to transform the information (educational material) using certain pedagogical technology and tries to give the transformed information to a student. A student by receiving this information will transform it again, makes it unconsciously. He makes it intuitively, due to the fact that he does not know the mechanisms of the information conservation. Where is the subjectness of the trained person? According to our reckoning, he will become the subject only at the time when he knows and applies the information conservation; he himself chooses the mechanism of transformation of the information, instead of being engaged in the spontaneous transformation of the transformed information or code conversion.

In order to get a conscious transformation of the information, it is necessary for a teacher to organize process of training that the trained person may ask himself the question: "What conditions are required for the effective implementation of the information conservation law? What principles are required to be used during the classes to reveal the information conservation law? Which methods, technics are peculiar to apply the information conservation law during the classes? When he asks these questions and will find an answer for them. At that time training will be effective.

The educational process will represent functioning system according to the laws of space and time, where the training is identical to the laws of causation.

The law is the method, manner and rules, using which our perception perceives a number of phenomena; it is in the perception. Actually, our

perception resonates with the laws of space and time; otherwise, it has not determined any law of space in time.

The brain of the man, being the human body controlling system, uses the determined laws consciously for the development and new growth of the personality of the subject. On this background, the law is the consecutive or simultaneous repetition of the known phenomena accompanied by the conviction in a regularity of their repetition enabling to embrace a common method of all series of the phenomena to our consciousness, as well as the brain to direct the human body in the direction, which is peculiar to his nature or natural development [6].

It follows from what has been said that the organization of the educational process on the basis of “the principle- lawfulness” requires another approach to training, namely the process of training should be built in the causation conscious, laws, genetic relations, interactions and conditionality of all phenomena and processes occurring in time and space.

The information may be understood not as any messages transmitted in the subject- subjective or object -subjective relations during training and those, which reduce uncertainty of the information receiver, i.e. the trained person. The more this uncertainty decreases in the consciousness of the subject; the less the information is reduced, which is necessary to be received to eliminate the uncertainty of the predicted activity concerning the decision of problem situations at classes.

Consequently, the law of information conservation for the theory of training can be expressed in the way that the information is conserved in the consciousness of the subject so long as the process of transformation of the new information will not decrease the level of uncertainty of understanding of the investigated object.

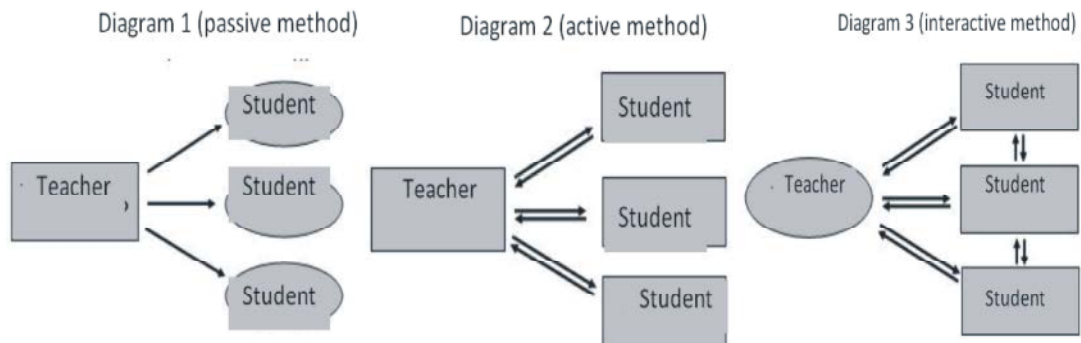
Let us assume that the teacher gives the secondary information to students during the classes. The contents of the secondary information in a human community is a knowledge of the world surrounding us determining the behaviour of the man due to the fact that being based on this knowledge, the man interrelates with another nature. This nature as the form (structure) of the material bodies surrounding us and their movement represents the primary information.

In the theory of communication, the information arises in the form of various messages: for example, letters or figures, as in telegraphy, or continuous function of time, as at a telephony or broadcasting, but in any of the specified examples, the final task is to transfer the semantic contents of the human speech.

In its turn, the semantic contents of the teacher’s speech during the classes can be represented in sound fluctuations, in a written statement, gestures and mimics. U. Ashby, being one of the representatives of researchers, has paid a special attention to this surprising property of this kind of information - to represent the same semantic contents in the most various physical kind. This property of the secondary information is called as code conversion. To communicate with other people, the man should constantly be engaged in coding, code conversion and decoding.

So, the teacher by training sets the purposes and tasks of classes and uses the innovative technology of training-all this is the information reduction, which is spread during the classes. It is important to understand by training: how it is possible to give information with the least loss. In Pedagogics, the methods of training have been developed for the best mastering of an educational material.

There are 3 methods of training: passive, active and interactive. See Picture 1. Drawing 1, 2, 3.



Pic. 1: The diagram of teaching methods

- Passive – the trained person acts in the role of the “object” of training (listens and pays attention);
- Active – the trained person acts as the “subject” of training (independent work, creative tasks);
- Interactive- interaction. The process of training is carried out in terms of constant, active interaction of all participants. A student and a teacher is the equal subjects of training.

Therefore the aims of nowadays education demand to choose educational methods promoting active process of cognition that develop skills of learning, creative use of knowledge, skills of self-assessment, cooperation, indulgence to different points of view. Interactive educational methods help to realize those tasks and provide cooperation among teachers and students [7].

Let us request assistance from K. Shannon by asking this question.

K Shannon has noticed that in transformation of the verbal messages the frequency of the use of various letters of the alphabet is not identical: some letters are used very often, others are used rarely. There is a definite correlation in alphabetic sequences, when the occurrence of one of the letters with a high probability is followed by another [8].

It means the teacher can code the information in such a manner that she will reduce uncertainty of understanding and easily acquired by the student. Therefore, we can assume *what to explain clearly and availably is to code the information by certain rules appropriate to the law of the information conservation.*

We have a diagram with a complete set of rules for the information conservation law, in our understanding. According to each of these rules, we can calculate meaning for each of the kinds of the information. Consequently, the information is the spatial arrangement of the matter organized by determined rules. What is this rule and in what activity they should be revealed?

This or that kind of the human activity is the coding of the information by means of developing certain rules of the information conservation.

So, the content of *verbal and logic* memory are the ideas, concepts and verbal formulations. It owns the main role during the process of acquiring new knowledge in teaching.

The *visual* memory is the strongest and, at the same time, the most artful type of memory. The potentiality of the visual memory is huge, but at the same time it results in reproducing perceived images with significant distortions.

The *acoustical* memory is directed to the perception and analysis of sounds. We often should expect only on this kind of memory, for example, in perception of voice, musical sounds and a foreign speech. As a rule, the acoustical memory operates together with verbal and logic, for example, when we reproduce lectures, conversation and telephone conversation.

The *locomotory* memory plays the main role at mastering by various motor skills, for example, in teaching games using a musical instrument, during typing, driving a car and etc.

Except for the listed types of memory, it is possible to allocate memory of *emotional, flavouring, tactile, voluntary* and *involuntary*, which are also important for the development of internal “myself” of the human body, for the formation of training strategy, for the development of cognitive abilities as well as for the adaptation in the environment.

We can assume from the above-stated case that the information conservation in the conscious depends on the quantity of the kinds of activity and/or from the certain kind of activity. The more kinds of activity the trained person carries out, the more the volume and duration of the information conservation becomes. It means that the certain kind of activity in the structure has the mechanism of coding of the information appropriate to the rules of the necessary information conservation.

For example, the skill can be developed only during one’s own activity (driving a car). To know does not mean to manage. It means that the knowledge does not give the information concerning the investigated subject. There is no certain coding of the information, which promotes to the understanding of researched object and acquiring it. Understanding of the object at the information level takes place during the formation of skills. The subject begins to feel the researched object; he calculates the information, which has another code which is different from the code of knowledge.

There are concrete laws in the common theory of the information. The law of the information conservation: “The information preserves its importance in the invariable form while a carrier of the information – memory is in a constant form”. The basic information law of shaping and development of a matter: “The information determines the information” [9].

On the basis of these laws, it is possible to make the following conclusions [10].

Firstly, the repetition of the information does not give new information and the transformation of the information gives the information different from the previous one.

The transformation of the information *increases* (changes) the volume of the memory at the expense of storing new mechanisms of information transformation. On the basis of occurrence of information mechanisms in a cortex, personal relations occur in the consciousness of the subject to the information transformed, which are peculiar only to its psychophysiological structure, consequently, the subject can not pass this structure without changes (without losses of the information) to another subject.

Secondly, being based on the law: "The information determines the information", the information is the basis of forming personal qualities of the subject, i.e., personal development of the student, his new growth is the modified information. Let us explain: by receiving huge amount of information, the student is capable make a choice. This relates to the principle of decision choice. This principle of cybernetics means that *the decision should be made on the basis of a choice of one of several variants*. This principle takes into account the interrelationship and conditionality of quantitative and qualitative changes. And the transition of amount into a new quality is considered as the development. Consequently, the training of the student is resulted on the basis of information conservation and choice of the information in his consciousness. The conclusion is: *the choice is a transformation of the information in accordance with the set task*. The process of training corresponds to the development of student's mental functions, i.e., there is a process accompanied by the new growth and continuity in a number of conditions of the subject's development replacing each other.

On the basis of the available knowledge, the student acquires the information, transforms it as well as uses. There is a continuity of information. The continuity, which is understood by the measure of causal dependence (non-randomness) of the subsequent conditions of the subject's development from the previous one connects into the overall process of development and gives the property of certain orderliness, orientation and stability (according to the terminology of KH. Woddington).

The information conservation in the consciousness of the subject is possible when there is a measure of independence of uncertainty of the subsequent condition of the subject's development in relation to previous ones in his consciousness. This measure (or novelty) causes: 1) the opportunity of consecutive change of the previous condition by subsequent one; 2) the absence of strict determinism.

Consequently, the law of information conservation in the consciousness assumes the necessity of understanding the mechanisms of continuity and novelty. It is logically alternative, but strictly additional concepts. Each of them implicitly assumes the opposite one.

The continuity assumes the updating of the information in the consciousness of the trained person. Otherwise, the developed subject remains constant. During the process of training, the more the continuity is strong, the weaker the new growth of the student, the worse is the process of training.

The novelty assumes the continuity. The more the novelty is, the less synonymous the communication of each previous condition with the subsequent one, the more discontinuous (discrete, nonlinear) the process of training is. But, simultaneously, the growth of novelty decreases the continuity and increases the risk of its interruption, consequently, the risk of interruption of dynamics of the process of training and the training will be not uniform, faltering and, at the consequence – not effective.

Inefficiency of the process of training, from the point of the law of information conservation, tells about the fact that in the psychological structure of the student. We understand as the structure: the internal structure determined by more or less steady natural spatial and time organization of elements (psychological functions) providing its integrity despite of the change of conditions provoked by the certain external influences and/or internal indignations, the new growth slowly occurs. For acceleration or speeding up of the arisen inertia, during the transformation of the information, it is necessary for the trained person to pick up technology of the information conservation, which is peculiar to the psychophysiological nature.

Consequently, the novelty, continuity and inertness, on the one hand, violates the symmetry of the law of information conservation and on the another hand, promotes the formation of new mechanisms of information conservation, that improves the carrier of the information, i.e., memory.

Let us turn to the following moment during the information conservation. Let us assume that the trainee has acquired certain information. The acquired information can be revealed in different ways: in knowledge (it is obvious) and also in character traits and in the quality of the personality. Consequently, if the information is conserved by the trained person, but not being revealed in the knowledge, skills concerning a certain subject, this very information will be revealed in another spatially time, but in another form.

For Successful Implementation of the Law of Information Conservation in Teaching

The First Requirement: it is important to realize to the subjects of educational process the essence of the mechanism of the law of the information conservation (novelty, continuity and inertia), which determines the efficiency of personality teaching and trajectory of its development. Actually, the law of the information conservation forbids all opportunities, which do not correspond to its mechanisms.

The Second Requirement: it is necessary to ensure understanding, that the subject, during the process of training, studies, learns, investigates not the information itself and his personal contact with it. This reflection will help to understand to each subject of the educational process the mechanism of the information conservation. The reception of own experience about the contact with the information is inevitably connected with the loss of the previous information. On this basis, the third requirement occurs.

The Third Requirement: it is expedient to generate readiness of the subject of the educational process to the constant novelty. This readiness is expressed, basically, by the necessity of destruction of the determinism (Yu.G.Antonov) for the achievement of the qualitatively new condition and increasing the level of organization of the system it is necessary to destroy (to reconstruct) the existing, generated in previous experience, the determined structure of communications of the elements of the system.

CONCLUSION

The implementation of “the principle of legality” during the process of education can promote the unity and systematization all its component parts.

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