TO SOME PECULIARITIES OF VISUAL AND AUDIAL INFORMATION PERCEPTION IN E-LEARNING

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ABSTRACT

E-learning and distance education technologies have become a part of modern education and imply a wide range of providing learning materials. The most widely used asynchronous means for material delivery are video-lectures, mini-clips and video-podcasts. Many university professors find them very useful; however, not every university professor has enough knowledge about psychological aspects of visual and audial information perception. In the paper the author ignores the main distinguishes between these three audial-visual means mentioned above conditionally combining them into one term – a video-lecture, since the work is devoted to the characteristics of visual and audial information perception. These characteristics are to be taken into consideration while preparing a video-lecture.

Key words: e-learning, distance education technologies, video-lecture, visual information, auditory information, information perception via audial and visual channels.

INTRODUCTION

Problems of perception and processing of information were already highlighted in the literature in the 50-70s of the last century, including Russian literature. Many of the described investigations are topical nowadays concerning delivery methods in distance education technologies such as video-lecture.

A video-lecture is a complex source of information which simultaneously affects the auditory and visual analyzers. Any video-lecture is an information model. While creating a video-lecture at least two important factors are to be taken into account:

- Information model being a kind of representative of those objects that it contains should include the certain structure of the objects.
- Any information model serves as a means of transmission of information about an object, therefore, the consideration of information perception and processing laws is of great significance.

In other words, the structure of verbal and objective material that ought to be presented in the video-lecture and information perception, processing and understanding laws affect the internal organization of a video-lecture.

As is well known, perception and comprehension are two sides of the information processing process; they are so closely allied with each other. Separate consideration of perception and comprehension is conventional in psychology, since it allows detailed investigation and description of these both processes.

STUDY

Psychological characteristic of verbal and representational information perception

The primary link in the process of information processing is perception. Let us analyze similarities and differences in speech perception via auditory and visual channels in the video-lecture.

The studies of the theoretical bases of perception allowed us to single out some common points that characterize this process independently on the reception channel – audial or visual.

The functional connection between auditory and visual analyzers during the processes of listening and silent reading was proved theoretically and experimentally. Electrical activity in muscles of vocal apparatus depends on the formedness level of reading and listening skills. Reduction of speech-motor strain means that all “… components of speech complex – motor, auditory, visual – strongly combined with each other into a united system of temporarily nervous connection ..., and as a result velocity of speech perception and comprehension increase” (Sokolov, 1960).

The formation of speech-motor mechanism in a foreign language is associated with the formation of internal speech which develops on the base of external speech as its projection, and then reduces gradually and gains the generalized characteristics. Speech-motor impulses become apparent in detailed speech analyses and synthesis when internal speech exists at the stage of “silent external speech” (Tsvetkova, 1969). The formation of dynamic stereotype shows reduction of speech-motor irritations.

Said above is necessary for confirmation of accompanying sound importance in the video-lecture, its specific organization within this source of information, since sounding speech exactly is the base for the internal speech formation.
According to the psychological investigations, perception process has the phase nature independent on the connection channel via which information is transferred. All stages of receptive activities aimed at forming and sensing the image-template are inseparably linked.

B. Lomov considered the process of image forming as a primary component in the process of sensing, whereas the secondary component, on his opinion, is “matching of this image with the template system stored in the memory” (Lomov, 1966). The part of Lomov’s work, where he writes about existence of common features in the processes of image forming and image sensing and their phase nature, is the most interesting. However, it is hardly ever possible to consider image forming as a component of image sensing, since they are timely distant.

V. Zinchenko wrote that realization of sensing and reproducing act is possible when the image has been formed (Zinchenko, 1980).

There exists a certain time limit at which it is possible to completely sense the feed image. Time limitation serves to develop the skill of simultaneous perception of auditory and visual information.

The formed image serves as a template for sensing of newly apprehended images. The matching process occurs either element by element (fragmentary phase) or completely (global phase), depending on the fact whether the object is well known or not respectively.

Listening to or reading a complicated text a student apprehend only separate words and cannot synthetize them to discover the sense of the utterance, and contra versa, an easy text is apprehended at the synthesis level immediately.

While designing a video-lecture it is advisable to aim structural perception including both phases – global and fragmentary. The decision to start teaching with the global perception (synthesis) through fragmentary phase (analysis) to reach a structural perception unity or with the fragmentary phase (analysis) through global perception depends on not only on perception patterns but on the material which ought to be perceived.

Apart from the qualitative characteristic of perceived material, quantitative characteristic is also of great importance. Not only the grade of acquaintance but also the volume of perceived material influence on the perceptual process. As the stages of the stages of element-by-element matching are digested, the recognition process changes creating structures due to emphasizing of critical and fiducial marks, screening of redundant information.

When creating a video-lecture it is important to set fiducial marks of verbal and objective information, to set criteria for essential and unessential features.

The ability of human memory to perform re-encoding into categories on the base of certain features facilitates not only information storage but also velocity of recognition. Thus, while pattern forming delivery of multiple various but with common features templates is more important than multiple repetition of the same templates.

Let us turn to the main characteristics if distinguishes between perception of visual and audial information.

If the way of recognition does not depend on the information channel (visual or audial), stimuli effect and pattern persistence have different characteristics in the recognition process depending on the information type.

Perception of audial information is limited by the speech tempo of a speaker and information enters the audial channel as an inconvertible sequence of sounds. In the process of listening we cannot return to the incomprehensible or unknown material. The single occurrence of audial reception impedes the recognition process, the more especially as the noise immunity is not high.

Visually perceived information has sufficient field of view which provides opportunity for the second view and simplifies the analysis in the case of difficulties in understanding. The recognition process of visual information is significantly facilitated by the effect of “residual pattern” (Sperling, 1967), which is explained with the fact that visual information tends to keep features of the irritant for some time after its disappearance.

The effect of “residual pattern” and volitional eye fixing, depending on the task complexity, can serve as the basis for election and proportion of information types, their timely organization in the video-lecture. Thus, in creating of synchronized perception of audial and visual information it is significant to consider that the latter can disappear earlier than audial information; however, volitional eye fixation will keep the visual pattern for some time.

The regularities of perception and recognition of information entered through visual and audial channels can also form the basis for timely organization of different information types in a video-lecture.

It ought to be underlined that psychologists established the difference of listening and reading processes not only in the term of verbal-audial and verbal-visual perception, but also in the term of influence of these two types of speech activity on perception.

The tension in the reading process is less than in the listening, since the reading pace and the information receiving in the first case depends on the reader only, and in the latter information receiving pace is set by the speaker. However, as a result of greater tension during the listening process more information is sometimes kept in the memory and for longer time than while reading. Thus, the advantage of reading – independent tempo selection – becomes its disadvantage, which is possible to overcome through pace management of information delivery. The use of graphics in a video-lecture violently increase or decrease tension of information reception, what leads to the persistent memorizing of material.
The proportion of verbal-visual and objective-representational information allows suggesting the distinction in perception of these two types of information. First of all it becomes apparent in the signal recognition velocity. Known that verbal information can exist in a letter or sound code and leaves in the memory a collapsed outline; representational information can be presented in a few variants – objective, schematic – and leaves in the memory a congruence pattern.

To distinguish verbal information all three differential features are required; and in the process of recognition of a picture only a few basic features are required. In addition, in the recognition of picture-signals the processes of distinguishing, matching and encoding are realized simultaneously due to the mechanism of association by similarity. In recognition of verbal signals these processes can mismatch, mistime, since representational information possesses higher interference persistence than verbal information, but has a lack of appropriateness. All this must be taken into account to create additional visual elements for the video-lecture.

Caricature or cartoons, exaggerating certain features of an object and as a result disfiguring its essential elements are recognized much faster than precise photographs of the same object. In addition, a certain grade of generality, symbolism gives a reader the opportunity to accept the picture relying on their precede experience, what positively influence on material digestion, since schematization, being a kind of generality, promotes skills transfer. However, it should be taken into account that the schematization of a picture must have a limit, i.e. it cannot trespass against the principles of signal and object ratio principles.

Then we have to pay our attention to the significance and necessity of motivation in the perception process, which determines the features of organization of all types of information in a video-lecture, the quality of their information load and participation grade in creating of a situation for interacting.

When motivation in perception is considered as interaction between perception subject and perception object, it is a specific person condition appearing on the base of unity of a need and a relevant to this need situation. The unity of need and situation creates willingness to behave and act in a certain manner. This kind of willingness is based on modification of physical and psychological processes.

In the fifties-sixties years of the last century physiologists reached a conclusion, that appearance of any kind of perception is preceded by formation of “activity acceptor”, i.e. a certain mental set in the brain, therefore, signals received by the organism serve for creating of either “activity acceptor” or actualization of fixed, that means, mental set generated under certain conditions.

The fixed set can influence positively or negatively on the activities character and results; it makes perception more accurate and precise, leads attention to the required object, or, contra versa, deteriorates perception and understanding of information. The set promotes the perception in that case, when actual event concurs with expected one.

The set can base on two levels: perceptive and mnemonic. Regularities of organization of information in a video-lecture are results of that.

First of all, it should be mentioned that the set can be both in verbal and representational forms of information.

While synchronous presentation of two types of information it should be taken into account that according to the theory of setting any information can be either information-goal or information-supporter. Herewith information-goal appears earlier than information-supporter. In this connection presentation of verbal-audial, verbal-visual or verbal-representational information depends on that, which role it must play in a certain part of the video-lecture.

Determination of dependence between verbal and representational information is possible only as correlation of logical and sensual in the information processing.

In this connection we should analyze the second important stage in the information processing – comprehension – and not only from the position of perceived but also understood information come closer to the issue of correlation of all types of information in a video-lecture.

**Psychological characteristic of comprehension of verbal and representational information**

The process of comprehension is the second important stage of information processing.

The feature of this process is that it depends not only on the information delivery way and information type but also regularities of information processing at perception level. Herewith the perception process of oral and written speech has more common regularities than distinctions. The main distinctions depend on the material character (verbal material or picture, animation).

In this connection we should analyze the process of comprehension of verbal information, then consider the process of comprehension of representational information and, finally, set regularities for delivery of all information types in terms of correlation of logical and sensual.

Comprehension is a sophisticated psychological process, based on thoughts and realized by revelation of object or phenomenon entity, reflection its features and links.

Rendering of general and specific models of comprehension processes depends on the position how to work out this model.
CONCLUSIONS

The given analyze of the perception and comprehension processes enable to establish some regularities for material organization and its delivery in a video-lecture:

1. The general scheme of perception and comprehension level of verbal information can be presented as following:
   - Formation of a pattern;
   - Pattern recognition;
   - Formal comprehension;
   - Comprehension of cognitive contents;
   - Comprehension of utterance sense (Re-encoding to the language of a recipient).

Highlighted levels have a relative character. To reach simultaneous perception and comprehension is possible only through overlearning at least of first three mentioned above levels. Overlearning is reached by drilling with the use of supporter, which role in a video-lecture verbal and representational material can perform.

Taking into account that fact that geometric figures require less time to process information than verbal material and, on the other hand, analytical character of thinking developed in students under influencing of engineering disciplines, we suggest that schematic representation is more preferable as supporters in a video-lecture.

2. While organizing the audio in the video-lecture it is important to consider following psychological regularities of processing of audial information:
   - Vocal accompanying inspires formation of the speech-motor pattern of a word; that is why the sounding speech must be exemplary and accessible at the same time.
   - The recognition process of studied material has consequential or simultaneous character. Unknown or complicated for listening material cannot be processed instantaneous. Huge attention must be paid to the speech tempo, correct intonation division and logical emphasizing of new.
   - The perception process of audial information is obstructed by the fact that the constancy of a sounding pattern is small, the pattern disappears along with disappearing sounding speech. Therefore, all processing of information while listening happens at the moment of speech perception; and continuity of perception at listening restricts time for information processing. Under such conditions possibility to keep the pattern is achieved either by the speed change, or visual supporter existence.
   - Superfluous sounding speech deceleration negatively affects keeping and memorizing information.

3. While organizing the visuals in a video-lecture it is important to consider following psychological regularities of visual information processing:
   - Visual information in a video-lecture can be dynamic and static. To accept verbal-visual information momentary it is necessary to teach students to analyze material with the support on formal features.
   - While creating representational information it is important to emphasize the outline, important details.
   - Stability of visual pattern can serve as the basis for correct composition of visual and audial information at their synchronous delivery. For this reason visuals can disappear earlier than audial, since it is fixed for some time in the student’s imagery.
   - Tension of the perception process which contributes to stable and longstanding memorizing can be reached through reduction of time for presentation of visual information.

4. Study of psychological bases of information perception and comprehension as well as the set theory allows concluding that material organization in a video-lecture depends on the role of a material in a video-lecture – the role of a supporter or the role of a goal.

REFERENCES