

THE FEATURES OF THE AUTOMATION OF DIAGNOSTICS OF THE COLOR-PERCEPTION
OF THE COGNITIVE MODEL OF THE SUBJECT OF TRAINING FOR THE ANALYSIS
OF THE INFORMATION ENVIRONMENT OF THE ADAPTIVE TRAINING

For the creation, system analysis and the improving in the efficiency of functioning of the information-educational environments (IEE) and the automated training systems at distance have been developed the cognitive modeling technology, which includes the technique of its use, the algorithm of formation of the structure of the cognitive model based on one from the classical or innovative models of presentation of the structured data, the several ways of representation of the structure of the cognitive model (the oriented graph, combining the theory of sets, the multilevel structural scheme and the calculus with using of corteges on domains), the parametrical cognitive models block (the cognitive models of the subject and means of training), the techniques of research of the parameters of the cognitive models, the algorithm of processing of a posteriori data of testing of the level of residual knowledge and the individual features of trainees.

The parametrical cognitive models block realized the possibility of creation and usage of the contour of adaptation, which allows to take into account the physiological, psychological, linguistic and other features of the contingent of trainees.

The cognitive model acts as the (re)constructed in width and depth by the repertoire of parameters, echeloned on a row of portraits and stratified on a row of sets, which are located on two levels of the selected hierarchy: the set of the kinds of properties and the elementary properties, the set of the vectors of parameters and the elementary parameters.

The cognitive model of the subject of training concentrates the parameters, which characterizing the individual features of sensory perception (the physiological portrait), processing (the psychological portrait) and understanding of the content (the linguistic portrait) of information fragments in a certain subject of studying.

The cognitive model of the means of training accumulates the parameters, which reflect the technical capabilities of the means of training at the visually representation of a row of information fragments taking into account the parameters of background and font, color and sound scheme (the physiological portrait), in the view of text, table, flat or volumetric scheme, video or sound flow (the psychological portrait) in the national or foreign language and the level of statement of the content of the subject of studying (the linguistic portrait).

For the automation of the tasks of the system analysis and research of IEE of the complex of programs is developed, including: the adaptive electronic textbook – generates a row of educational influences by means of the adaptive representation of information fragments processor, which allows to take into account the physiological, psychological, linguistic and other individual features of the trainees and the technical capabilities of the means of training at the visual representation of the information; the basic diagnostic module (DM) – provides the testing of the level of residual knowledge of the trainees by means of a set of tests in the subjects of studying; the applied DM – realizes the diagnostics of the individual features of trainees based on the methods of research from the field of private physiology of sensory systems, cognitive psychology and applied linguistics.

The research of parameters of the color-perception is carried out by means of usage of the method Rabkin E.B. (the polychromatic tables) or Justova E.N. (the threshold tables).

The polychromatic table represents a set of pigment spots of different color and size, the sensory perception of which allows to register the certain symbols (digits and letters) and to indicate the trichromacy or the certain kind of pathology of color-perception (dichromacy: protanopia – the lack of the sensitivity of retina to the red color at the photopic vision, deuteranopia – the potential inability of the conical apparatus of the retina of the eye to register the green and shades of green color, tritanopia – the lack of sensitivity to the violet and shades of blue color).

The threshold table represents a set of squares of the same size and different color with the sensory perception of which the examinee needs to register the direction of absence of the differences in the gradations of two colors, otherwise the certain kind of pathology of color-perception pathology and the degree of its manifestation (the 1st, 2nd and 3rd degree of expression or complete dichromacy: protanopia, deuteranopia or tritanopia).

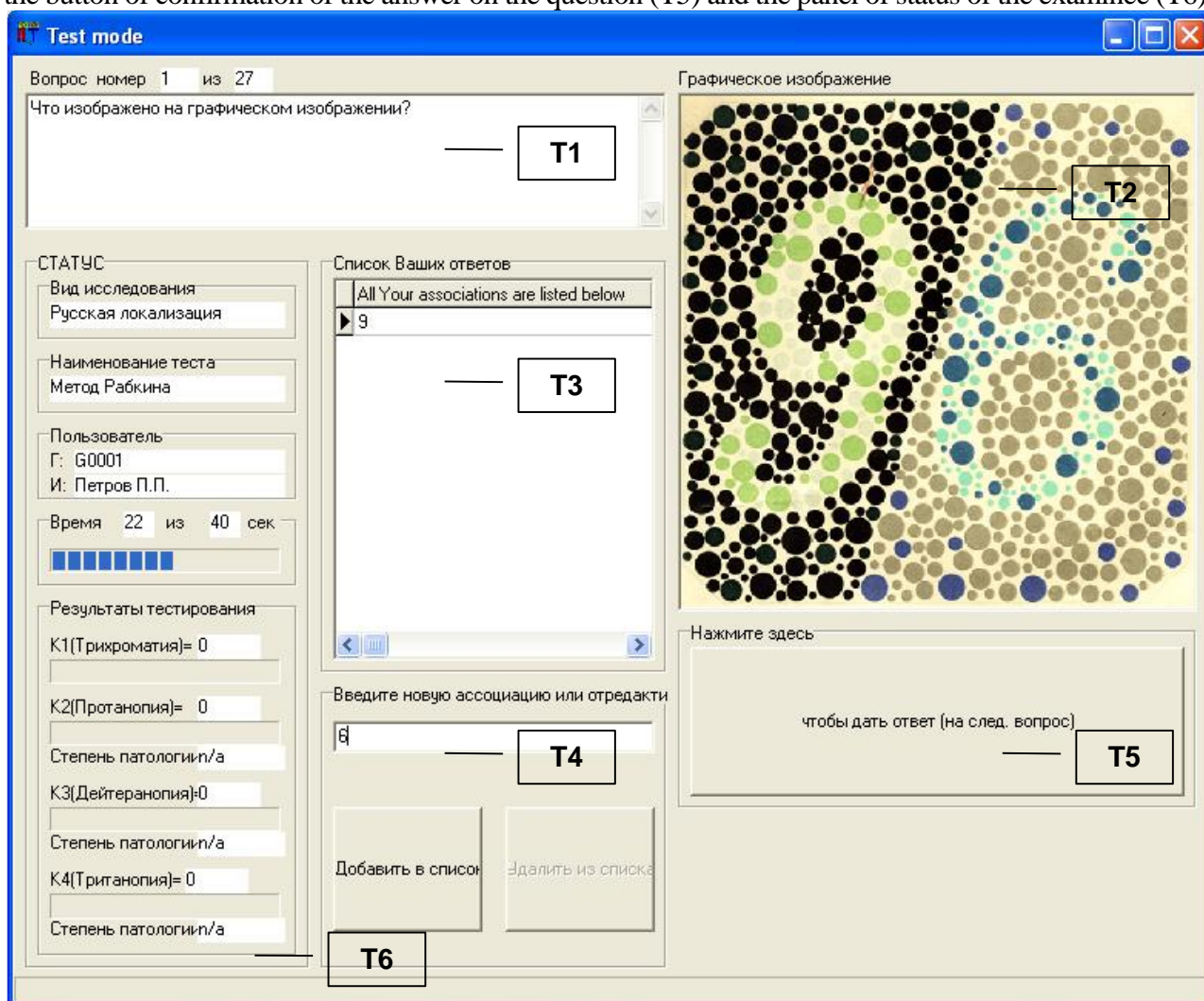
The procedure of research consists in the sequential presentation of polychromatic tables or the threshold tables as the visual stimulus and the subsequent registration of answers of the examinee after 5 sec.: at the incorrect recognition of the corresponding character (digit or letter) or the direction of absence of the differences between the gradations of two colors, the fact of presence of a certain pathology of color-perception is indicated and registrated.

The new procedure of diagnostics of the monocular and binocular color-perception of the examinee, realized during the management of the diploma project, is located in the database of the methods of research of the applied DM (the diploma-student Shaposhnikov A.V.).

The program realization of the procedure of diagnostics of the parameters of color-perception of the examinee was carried out by means of the integrated RAD-environment of object-oriented programming Borland C++ Builder in the language of high-level C++.

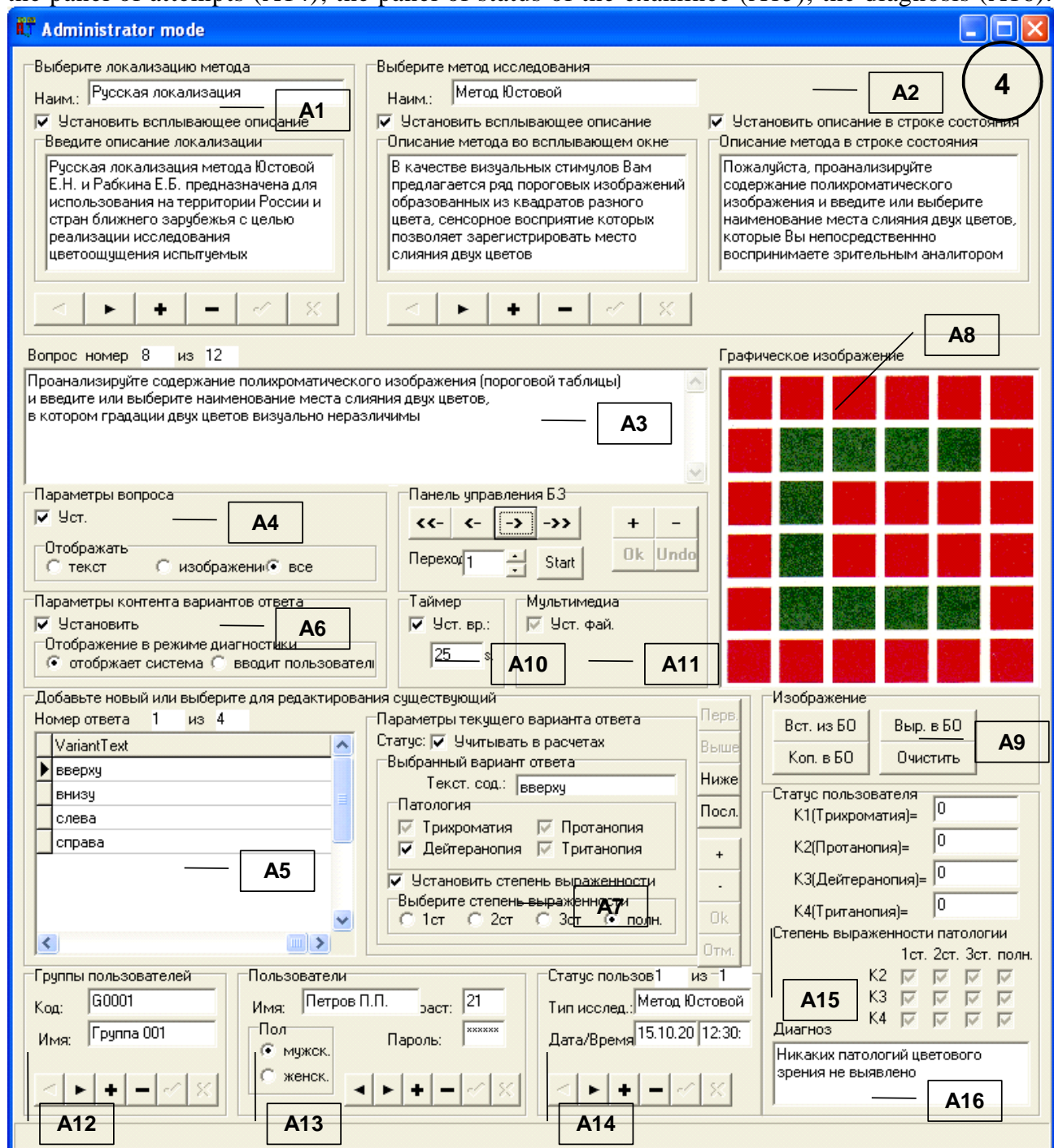
The program product supports the three-step authentication of the user, and also a row of main modes of working: the mode of registration of a new or existing user, the mode of administrating of the parameters of the method of research and the accounts of users, the mode of diagnostics of the parameters of color-perception of the examinee.

In the mode of diagnostics (pic. 1) shows the wording of question (T1), the graphical content of question (T2), the list of the variants of answers of the examinee (T3), the field of entering of the variant of answer (T4), the button of confirmation of the answer on the question (T5) and the panel of status of the examinee (T6).



Pic. 1. The interface of application of the mode of diagnostics of the color-perception (the method of Rabkin E.B.)

In the mode of administrating supporting the modification of the parameters of the method of research and the accounts of users: the localization (A1); the method of research (A2); the question (A3); the parameters of display of the content of question (A4); the list of the variants of answer on the question (A5); the parameters of display of the content of the variants of answer (A6); the status of accounting of the variant of answer in the calculations of nominal values of the coefficients, characterizing the pathology and the degree of its severity, the name of the variant of answer, the status of setting up of the type of pathology, the selector of choosing of the degree of severity of the pathology of color-perception, the navigator of the variants of answer (A7); the graphic content of the question (A8); the panel of control of the graphical image (A9); the timer (A10); the multimedia (A11); the panel of the groups of examinees (A12); the panel of examinee (A13); the panel of attempts (A14); the panel of status of the examinee (A15); the diagnosis (A16).



Pic. 2. The interface of application in the mode of administrating (the method of Yustova E.N.)

The practical use of the cognitive modeling technology and the complex of programs for the research of IEE was carried out in the learning process of "SPbSETU "LETI"" and "IBI" since 2003 y. 3 copyright certificates were obtained. The trends and dependences has been revealed.