acquired of man was more directed to the satisfaction of his own needs rather to preservation of the environmental balance. It influenced the upbringing, especially in the natural scientific sphere. The performed research showed that an interest of the youth in natural science is decreased and upbringing is nonefective. In Lithuania there is too little attention showed for upbringing of natural science. In strategic education documents there are not enough of unifinished items and contradictions.

Today is obligatory to create the entire education space based on open, with interacting influence forms, which could bring up knowledge and ability to keep ties among man and environment harmony. Reaching for these aims very urgend becomes development of natural scientific upbringing and its continuinty.

In Vilnius college of the faculty of Agrotechnologies is performed agrobusiness management, chemical analisys and food products technologies, veterinary science, landscape architecture and design studys program"s subjects connected with natural scientific know how. The tendency is noticed that basic level of natural science knowledge is too low, which has student before entering the college.

The main purpose of modern natural science upbringing is literacy of the whole country"s population in this field, for which is important to get consistently in all stages of education.

Key words: natural science education, college programme, the strategy of education, unified education space.

EMOTIONAL RESPONSE TO VISUAL STIMULI AND IT'S APPLICATION IN LEARNING

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Introduction

Today different teaching methods and applications may help young people and teachers in educational process. Teachers may use different multimedia sources that enhance learning capacity. Computers and computerized device's that allows create different e–learning system's which combine audio-visual stimulus or learning materials and biofeedback measurement devices like EEG for controlling efficiency of the studying process.

Hirato group find that the EEG information provides a more objective evaluation of how individual students respond and interact with auditory information. Another important implication of this study is that the EEG allows instructors to better understand the validity of adopting a specific task as a technique for improving listening ability during independent listening situations (Hirato, Hirato, 2008). But from other side emotional wellness of the students, their involvement in the subject of study has one of the major influence to ability of learning (Erlauer, 2003).

When emotional stress is increased than changes in all human's functional systems parameters are observed; influence of emotion exactly on psychophysiological processes is essential (Варламов, 2006).

Accomplishing researches about emotions influence on brain functioning characterizing parameters, informative is evoked potentials or event related potentials (ERP) methodology using affective pictures as stimuli while fixing human's brain response on this stimuli.

Evoked potentials curve analysis is inconvenienced by fact that affective picture used as a stimulus is complicated and complex (picture include different components such as form, color, intensity etc.). As well as correlation between human's subjective emotions and different cortex areas electric activity is yet discovered deficient that's why researches in this field continuous actively (Teplan, 2002).

Moreover affective pictures frequently are used as stimuli in attention investigation. Lang group (1997) offer to use term – natural selective attention to describe human's attention presence or absence, which is dependent on stimuli parameters. Person turns his attention only to notable and relevant surrounding stimuli after stimuli processing in subconscious level (Бетелева, Петренко, 2006). This acknowledgement is truly constitutive in pedagogical and educational fields.

Owing listed above the scientific work's aim was interposed to evaluate evoked potentials parameter's changes in the visual and associative areas of human cortex while affective picture observation. Dependant tasks were to:

- Select affective picture to each person individually
- Appreciate and compare visually evoked potential curve component's parameters in visually and associative areas

Materials and methods

Methodological part consists of two general parts. In the first part the main idea was to select maximally homogeneous experimental group to ease ERP analyzing and to choose each person's affective picture. Second part was ERP recording using picture chosen in first part.

In first part participated 24 students' aged 19 – 25, to compass group homogeneity they accomplished standard H. Eysenk's questionnaire to find out temperament type, the aim was to select choleric, because they have fast irritable nerve system and high reaction on emotional stress situations. Thereby were selected 15 choleric.

Further to find out each person's affective picture were constructed affective pictures presentations (*MS PowerPoint*). Pictures were taken from internationally approved International Affective Picture System (IAPS) where all pictures are standardized by tree parameters or dimensions – affective valence, arousal and dominance, each dimension vary in scale 1–9 thus they are divided into three categories: positive, negative and neutral pictures. Presentation included fifty pictures – ten neutral, twenty positive and twenty negative pictures. Every person examine presentation two times in different days and each time filled the form – Self Assesment Manikin (SAM) to evaluate all pictures by tree dimensions based on evoked subjective emotions regarding to each picture.

Based on SAM results we selected every person's individual affective picture which was evaluated stability (evoked same emotions) every time when person observed it. So were selected 5 persons, each of them had one affective picture which was negative.

In second research part were recorded ERP using computer programs Psy Task to demonstrate stimuli and Win EEG, which records ERP in continuous EEG mode. Overall were selected three negative pictures, because two persons were chosen the same picture and one neutral picture, which were included in Psy Task stimuli presentation (IAPS numbers 7041, 9301, 9561, 3266). Each stimulus was shown randomized forty times 1000ms each time so presentation length was 15min.

Program Win EEG allows record ERP in continuous EEG mode on person's head surface were placed twenty–one active electrodes based on international 10–20 electrode placement system. After continuous EEG processing were gained ERP curves from each electrode.

Results and discussion

Were analyzed each person's ERP curves components in primary visual area (electrodes O1, O2) and associative area (electrodes F3, F4) in right and left hemispheres. Visual area ERP were compared between hemispheres as well as associative area ERP, and visual area ERP were compared with associative area ERP in each hemisphere.

Comparable ERP curves components in primary visual area were first negative peak (first minimum; N1) which appears in 50 – 80ms after stimuli demonstration beginning and first positive peak (first maximum; P1) with latent period 100 – 150ms (figure 1); in associative area were analyzed following curves components: second minimum – N2 and second maximum – P2 which both appears in 150 – 300ms (figure 2). Each components parameters are latent period (ms) and amplitude (mV).

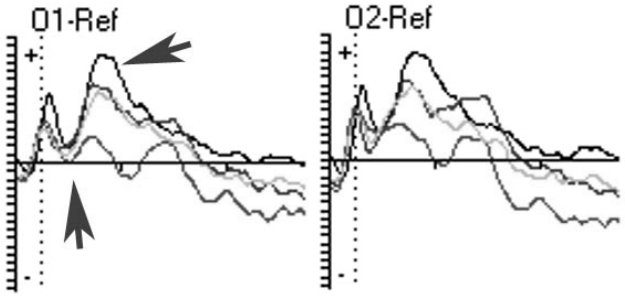

Figure 1. Evoked potentials in primary visual area (with different colors are marked different stimuli ERP curves; the bottom bolt denote curves component N1, top bolt – component P1).

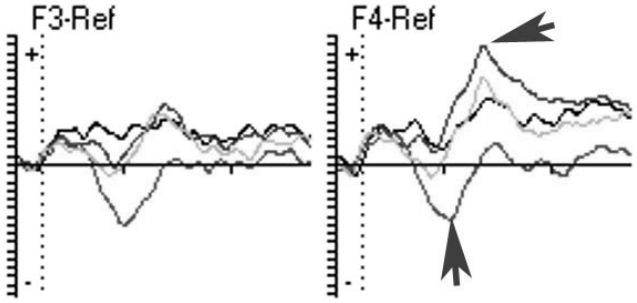

Figure 2. Evoked potentials in associative area (with different colors are marked different stimuli ERP curves; the bottom bolt denote curves component N2, top bolt – component P2).

Four person's exactly affective picture ERP components were more noticeable than other negative and neutral pictures ERP. Mainly are observed affective picture ERP curves positive components P1 and P2 amplitude increasing which shows higher response to consciously chosen affective picture. In right hemisphere associative area are observed amplitude increasing compare with left hemispheres which conform with previous researches using evoked emotions that right hemisphere is more involved in emotion analysis (Robbins, 2001)

As well as one negative picture which has the most apparent dimensions standard evaluation per IAPS data compare to other pictures presented ERP components increasing, Lang (1997) had noticed that in brain's response forming pictures arousal dimension acts the main role.

Our result agrees with other scientist groups' results in case of the reaction to visual stimuli that depends on the different types of temperament. Therefore when course materials are developed teachers must keep in mind that students' perception of the material depends on the temperament, especially in children group with attention deficit hyperactivity disorder (Batto, 2008). Other suggestion from our study is that is possible using biofe-

edback devices for measuring efficiency of audio– visual contents that is using in the learning.

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GAMTAMOKSLINIO UGDYMO INOVACIJOS

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Kėdainių jaunimo mokykla

Kėdainių jaunimo mokykla dalyvauja Tarptautinėje gamtosauginių mokyklų ir Lietuvos Respublikos sveikatą stiprinančių mokyklų tinklo programoje. Šiais mokslo metais buvo organizuota daug ekologinių, gamtosauginių, sveikatos stiprinimo renginių.

Straipsnio tikslas – atskleisti mokykloje taikomas netradicines gamtamokslines ugdymo kryptis.

Uždaviniai:

Pateikti gamtamokslinio ugdymo inovacijų reikšmę mokiniams.