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Students' psychological Characteristics as Factor of Effective Acquisition of Visual Information In E-learning

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Abstract

This article is motivated by the fact that teachers choose a form of visualization basing on their subjective views on the ways to make multimedia presentation or on the existing standards, not taking into account that effective acquisition of visual information equally depends on psychological characteristics of students. The main purpose of this research is to identify psychological characteristics assisting students' effective acquisition of information presented in different visual forms (text, charts, comics) in e-learning. The methods used included, firstly, experiment in an educational setting, secondly, control tasks created on the basis of Bloom's taxonomy, and, finally, psychodiagnostic techniques studying: cognitive and metacognitive skills, learning motivation, and self-organization. The findings allow us to identify which forms of electronic visual information are more suitable for students of certain psychological types. These results can help teachers to create conditions for students' more effective absorption of visual information by taking into account their psychological characteristics.

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1. Introduction

It is common knowledge that in an educational process the combination of students' individual characteristics and pedagogical conditions of learning are to be considered. Different tools for information visualization are widespread

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among teachers. However, choosing the form of visualization to present information on their subjects, teachers frequently rely on their subjective opinion about the effects of the multimedia presentation format (Bajgonakova G.A., Temerbekova A.A., 2013). Apart from that, they can use practices recommended by researchers of multimedia teaching tools, overlooking the fact that effective acquisition of visual information also depends on students' psychological make-up.

There are a number of studies describing students' individual psychological features which facilitate or hinder effective acquisition of information – psychological factors affecting learning. Il'yasov I. (2003) divides such psychological factors into two groups: cognitive factors (perception, memory, imagination, thinking, attention) and factors of personality (motivation, volition, emotions, self-assessment). In his study, Lejtes N. (1971) defines the following psychological components of information acquisition – students' positive attitude to education, their processes of perception, thinking, memorizing information. Applying V. Myasishchev's theory of personality, we suggest that the degree to which students absorb new information depends on the combination of students' motivation, cognitive and behavioral features (V. Myasishchev, 1995).

All these psychological characteristics could have a specific manifestation in an e-learning process. E-learning is generally understood as learning with the application of all kinds of electronic tools (for example: multimedia presentations, computers, interactive whiteboard, smart-phones, etc.) (Anderson J. 2005; Henry L. Steen., 2008). Information technologies in conjunction with face-to-face teaching are considered to be one of the means of e-learning (Guri-Rosenblit S., 2005).

Nowadays methodologists recommend the use of computers and multimedia presentations in class to improve students' retention of information by means of presenting it in the visual form. There is controversial evidence of pedagogical and psychological benefits resulting from the combination of these technological tools. For example, some researchers have come to the conclusion that a PowerPoint presentation created by a teacher for her lesson can «appeal to a number of different learning styles» (Masoud Hashemi, Masoud Azizinezhad, Masoumeh Farokhi, 2011, p.560), increases students' motivation and their engagement in the learning process (Stepp-Greany, J., 2002; Fateme Samiei Lari, 2014), enhances learners' learning achievement and learning satisfaction (Fang-O Kuo, Pao-Ta Yu, Wei-Hung Hsiao, 2015). However, Nouri H. and Shahid A. (2005) found that using PowerPoint presentations did not always help to memorize information and improve the results of learning.

The quality and degree of assimilation of information may be different depending on the form of visualization and students' psychological characteristics. Casteleyn et al. (2011) came to the conclusion that learners preferred e-lecture with graphic organizers to linguistic representations. Similar results were obtained by Johnson and Christensen (2011) in their research. This leads us to the idea that it is necessary to consider the connection between students' psychological features and the form of visual information in the learning process.

The purpose of this research was to identify students' psychological characteristics providing for effective acquisition of information presented via different visual forms (text, charts, comics) in e-learning.

Research Question: How do students' psychological characteristics influence effective assimilation of visual information?

2. Research Methods

2.1. Participants: The initial sample consisted of 166 students in the 3rd, 4th and 5th year at the Faculty of Applied Mathematics and Control Processes (n=76 female and 90 male students, aged between 19 and 23, the mean age being 21.06 years) and 111 students in the 2nd year at the Faculty of Biology (n=80 female and 31 male students, aged between 18 and 25, the mean age being 18.9 years). All of the participants were studying at St. Petersburg State University.

2.2. Research Methods and Instruments:

1. To conduct the experiment, we created multimedia presentations of information in three forms – «text», «charts», «comics» - on three subjects «Abilities», «Temperament» and «Character». These presentations were used by a teacher routinely conducting a class. Presentations were designed in a single style - black and white – to avoid the influence of color on the students' perception.

2. Control tasks were created on the basis of Bloom's taxonomy (Bloom & Krathwohl, 1956) in order to identify the degree of acquisition of visual information. Tests were developed for each subject taught («Abilities»,

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