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FUNCTIONS OF INFOGRAPHICS IN TEACHING A FOREIGN LANGUAGE IN HIGH SCHOOL

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Abstract

The article describes the cognitive-visual technology and the tool of infographics in relevance to teaching post graduate non-linguistic students a foreign language. Apart from the illustration function, educational and cognitive potential of using infographics as a learning tool are examined. The author analyses advantages and disadvantages of using infoposters in the educational process and highlights the didactic potential of this tool for developing a foreign communicative competence considering the characteristics of modern students' way of cognition. The stages of creating an infoposter are presented and the benefits of using this tool during class hours are explained. The article also provides information on experiment aimed at enhancing the communicative activity of students through the study of professionally oriented vocabulary and the implementation of exercises related to text analysis using the infographics tool. The results of experiment demonstrate positive dynamics in the aspects of forming professional thesaurus and developing analytical skills. The survey also shows students willingness to further use of infographics for self-study. Obtained results allow to make a conclusion that the use of cognitive-visual technology and infoposters can be considered an effective tool in teaching a foreign language to non-linguistic students in high school.

1. Introduction

Modern society is often called information society; although this term originated in the forties of the 20th century in connection with the advent of cybernetics, it gained active distribution much later (Solov`yov, 2010). The volumes of generated, transmitted and processed information are growing every day; in the educational environment, in particular, this leads to an excess of educational information, which must be somehow mastered, processed and analyzed. Social and technological progress factors also influence on the way of communication and perception of information (Evseeva, Obukhova, & Tanova, 2017). Modern information society and information environments, which products are huge volumes of text, visual and audio materials, also affect the cognitive sphere of the individual. The result of this interaction with the modern information environment was the emergence of a new type of thinking – mosaic thinking (Howe & Strauss, 2000; Semenovskikh, 2014; Shamis & Nikonov, 2016; Toffler, 2006). The main characteristics of this type of thinking are fragmentary thinking, lability of the nervous system, a sharp decrease in concentration and preference for non-textual information. At the same time, it is characterized by a high speed of processing information and an ability to work with heterogeneous information flow and multiple data streams simultaneously (O`Neil, Perez, & Baker, 2014). Therefore, we can conclude that it also influences on the students` learning styles (Fleming, 2014).

2. Problem Statement

Taking into account all the above mentioned characteristics of modern educational environment and emergence of new type of thinking and perceiving information, the search for technologies, methods and tools for working with large volumes of information is inevitable, as well as the search for ways and forms of presenting educational information in a format more convenient and effective for modern students.

One of the adequate ways of adapting the material to meet the needs and requirements of the current generation of students could be visualization of educational material. Therefore, our goal is to find an adequate technology and a tool to make the process of learning a foreign language and developing foreign communicative competence in high school more effective.

3. Research Questions

By replacing and refining lengthy texts, the graphical representation of educational information can simplify the meaning of the material presented while preserving the information integrity, denoting and integrating ideas, facts, connections and conclusions. Together, the illustration and the explanatory inscription can act as an independent element, which makes it possible to not only reduce the text, but also to structure it better. The use of graphics promotes a more successful perception and memorization of educational material, since in this case both hemispheres of the brain are involved: the left one, which is responsible for logical thinking, and the right one, responsible for emotional perception (Lupyan, 2015).

Thus, visualization can be defined as the way of obtaining and generalizing knowledge based on the visual representation, associative thinking and structuring of information in a visual form (Abdulayev, 2013).

Speaking of technologies, the basis of which is visualization, we consider it necessary to highlight cognitive-visual technology as a system of actions logically aligned and sequential, aimed at visual

transformation of educational material, the purpose of which is to increase the effectiveness of work with educational information by activating cognitive processes (Kondratenko, 2013, p. 85). As the name suggests, two aspects can be singled out in this term: "cognitive" refers to the sphere of application of this technology (to cognitive activity of students), and "visual" refers to the means of visualization with the help of which the educational material is transformed.

With the introduction of cognitive-visual technology, one of our objectives is to create learning conditions that pay great attention to using the reserves of visual thinking of students. Thus, within the framework of this technology, the visualization can become one of the leading methodological training aids.

Even though cognitive aspects of teaching a foreign language have been studied by a vast variety of scientists (Almazova, 2017; Bagramova, 2014; Rubtsova, 2017; Kogan, Khalyapina, & Popova, 2017), the use of cognitive-visual technology in teaching is considered mainly in the field of technical and natural sciences (Bershadskaya & Bershadskiy, 2016), however the field of humanitarian disciplines with regard to the use of cognitive-visual technologies remains insufficiently studied.

While using cognitive-visual technologies in teaching a foreign language, one of the most widespread tools is mind maps. Cognitive visualization can also be used in project activities, writing essays and organizing research activities, as well as while performing tasks such as brainstorming (Pavlova, 2015).

Another tool of cognitive-visual technology is infographics; while becoming more and more popular in corporate sector in the frames of microlearning (Baumgartner, 2013; Buchem & Hamelmann, 2010), it is still not actively used for teaching in high school.

4. Purpose of the Study

During our research study aimed at improving foreign communicative competence of management studies Master students of Peter the Great St.Petersburg Polytechnic University (SPbPU) it was noticed that there is a small number of visual supports in the authentic materials of the world's leading publications specializing in topics related to economics and management. Most often graphs or tables with statistical data are provided in the article materials; however, visualizations that directly reflect key points are extremely rare. Being adequately composed and used these non-verbal components could be of a great help in working with complex authentic texts (Pavlova, 2015).

It is also important to note that while selecting didactic material it is necessary to take into account that not every text can be used as an educational one. In addition to the topic relevance, its logical-compositional structure and narrative style are also important.

Considering all the above mentioned points, it seems reasonable to add the necessary visualization to selected authentic articles and lectures with the help of infographics. It is important to note that our objective was to give the cognitive function to visualization: creating and working with infographics involves more detailed processing of information, it is not just an illustration of the subject of study, but also its analysis, its subsequent transformation and rethinking.

The rationale of using this tool in SPbPU for teaching non-linguistic students is determined by the following factors: an acute shortage of class hours, a generally low level of development of foreign communicative competence, as well as heterogeneity of groups in terms of their foreign communicative

competence level, and orientation on studying profile disciplines related to their future specialty combined with a quite low motivation.

Given the global trends of globalization and integration, as well as Russia's participation in the Bologna process, one can safely assert that good level of English is absolutely necessary for successful professional communication and good career opportunities for a modern specialist in any field for.

Hereby, the relevance of the research is based on three main aspects: globalization and English being one of the main languages of professional communication, emergence of new way of cognition (mosaic thinking), caused by the changes in modern education and information environment, and the specifics of SPbPU local education environment described above. All these factors spur the demand in search for new tools and technologies that will meet the needs of modern students and help them to be competitive on the market. We consider infographic being one of such tools.

Information posters created with the help of inphographics tools can be divided into several basic types depending on the specifics of information they should illustrate and reflect:

• visualization of the article;

• block diagram;

• description of the chronological sequence;

• comparison of two objects, concepts, etc.;

• visualization of numerical indicators, statistics;

• photo-infographics;

• geographical infographics;

• hierarchical infographics;

• infographics for CV.

Of course, like any innovative learning tool, infographic has its advantages and disadvantages (Table 01).

Table 01. Pros and cons of infographic as a learning tool

Advantages	Disadvantages
1. Helps attract students' attention, increases motivation	1. The need to spend a lot of time and effort at the first stage while mastering the program and creating an infoposter
2. Helps to maintain high attention level, increases the speed of information perception, adds variety to the "dry" theory and / or simplifies and facilitates the perception of a complex topic	2. Necessity to pay a fee for the use of advanced service functions;
3. Provides an opportunity to present information from a different angle and / or present the same information in different ways	3. Possible problems with copyright (when using images from the Internet)
4. Structures information better (due to limitations in format, number of words, etc.), facilitates students' perception and memorization	4. The need to master the methodology for using this tool while working in the classroom (lack of guidance and recommendations)
5. Highlights the key points, omitting unnecessary details ("information noise"), allowing to laconically state the essence of the issue	
6. Develops analytical skills	

7. Presents information in a bite-size form, which, in turn, facilitates and increases the speed of perception and understanding of the material	
8. Allows to immediately apply the acquired knowledge in practice (exercises)	
9. Provides a wide range of free programs and applications to create an infoposter	
11. Gives a possibility of multiple use of the once created infoposter	
12. Does not require special technical equipment and equipment in the classroom; can be used offline	

As we can see, the benefits of implementing that tool in the learning process highly outweigh possible difficulties.

Let us consider the system of the teacher's actions of presenting educational information in the form of infoposters within the discipline "English for specific purposes" for non-linguistic postgraduate students of SPbPU.

First of all, it should be noted that in the process of creating infoposters, two stages can be identified: the preparatory stage and the stage of implementation.

The first stage includes the choice of strategy for composing the infoposter, i.e. determination of what exactly and why we would like to be displayed there, the selection of illustrative material and, finally the development of style and design.

In the scope of our research, the goal of creating an infoposter is to create a visual support that would stimulate the communicative activity of students; moreover, it is designed to help the teacher to compensate for the lack of knowledge in profile disciplines and background knowledge of students and variation of the level of foreign communicative competence.

Therefore, the first task in the process of creating an infoposter is the search (or creation) of visualization tools (images, graphs, tables, etc.) that would serve as a stimulus for students for completing the communicative task. At the same time, these educational materials should not answer the question, but only contribute to an active and productive search for the answer.

Since one of the main and most important objectives of the course is the activation of students' communicative activity, the vast majority of exercises within the classroom are performed verbally in pairs or mini-groups. Infoposters are used to ensure that while discussing some topic, there is a certain information base that helps students to actively participate in the discussion. In other words, we are trying to avoid a fairly common situation, when students do not participate in discussions with each other or with the teacher, because they have "nothing to say on the topic", i.e. they do not possess the necessary minimum knowledge on the topic even in their native language.

Having determined the goals and objectives, we turn to the selection of illustrative material. Starting to search (create) images, we must understand clearly what kind of information we want to take out on the infoposter. For example, in our course most of the sections (sub-themes) of the poster reflect the content of the article or audio recordings, which the students will subsequently work with. Accordingly, the teacher`s

task is to select the most important and necessary information within the framework of the topic from the big volume of authentic text and to focus students' attention on it.

Undoubtedly, students should be able to independently analyze the text, identify the key points, formulate the author`s stance etc. However, in given circumstances when working with non-linguistic students of a technical university with a low level of foreign communicative competence, with large groups and a lack of classroom hours it is not very effective to spend a lot of time on reading / listening and detailed analysis of authentic texts in class. From our point of view, it is more effective when the preliminary stage is conducted by the teacher in advance, the infoposter is composed on the basis of the selected material, and the students work in the classroom with the necessary and sufficient at this stage material. At the same time, within the framework of self-study, students will work more thoroughly on the texts to study new vocabulary and carry out exercises. Thus, on the one hand we make it easier for students to perceive new information and save class hours for practicing communication skills, and on the other hand, we give students the opportunity to work through the material individually, doing this more rigorously and with greater understanding.

5. Research Methods

Nowadays the use of infographics in teaching a foreign language is most often used in explaining or summarising grammatical topics, for example, phrasal verbs and phraseological units, since in these cases it is easier to visualize educational information. As a part of our research, we decided to expand the boundaries of using infographics in foreign language classes and create information posters for working with voluminous authentic texts in order to enhance the communicative activity of students through the study of professionally oriented vocabulary and the implementation of exercises related to text analysis.

The pedagogical experiment was carried out in 2016-2018 on the basis of SPbPU. A total of 50 students studying at the Institute of Industrial Management, Economics and Trade took part in the experiment, of which 24 are from reference groups and 26 are form experimental ones. The experiment included ascertaining, training and control stages and passed within the framework of teaching the discipline "English for Specific Purposes".

The training phase (2017) was the implementation of an experiment program that consisted of teaching students of the experimental groups using cognitive-visual technology and infographics as its tool, while in the reference group the training took place without the use of this educational technology.

The control phase of the experiment (2018) consisted of verifying the put forward hypothesis and analyzing the results based on the comparison of data from experimental and reference groups.

Infographics were mainly used for working with lengthy articles that contain a lot of new terms. Created infoposters allowed students to better understand specific terms and work more efficiently with the texts, focusing not only on the new vocabulary, but more on the content itself. Working with infoposters also helped students to learn how to analyze the text quickly and structure the information that should be reconstructed later.

During class hours, the teacher mainly performed the functions of the coordinator, and also monitored the student's educational activities. It is important to note that working with infoposters is

designed to maximize the autonomy of students when completing assignments, thereby providing more time and opportunities for developing communication skills and communicative competence.

6. Findings

The results of experiment demonstrated that active work with professionally-oriented vocabulary with the help of infoposters as well as the use of authentic materials contributed to the formation of a professional thesaurus and the development of a foreign professional communicative competence.
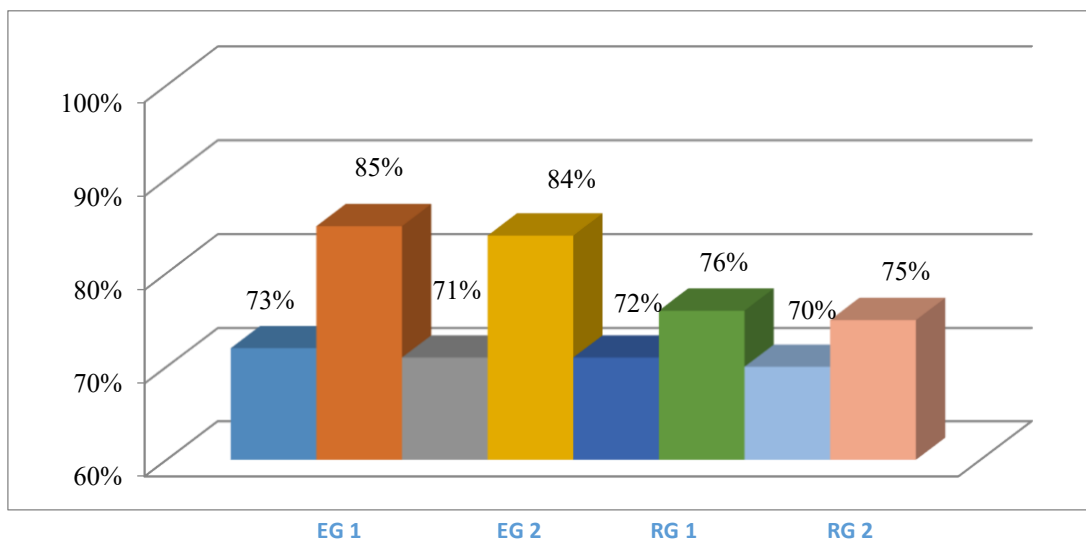

Figure 01. Level of the professional thesaurus formation

With the help of the placement test at the start of our course 4 groups were selected for the experiment. Figure 01 demonstrates that initially all four groups had almost the same level of professional thesaurus formation around 71-72%. At the end of the course retesting was conducted. As we can see on Figure 01, the final results of experimental groups in terms of forming the professional thesaurus were about ten percent higher than the results of the reference group: the average result of experimental groups were 83%, while results of reference groups amounted to only 74%.
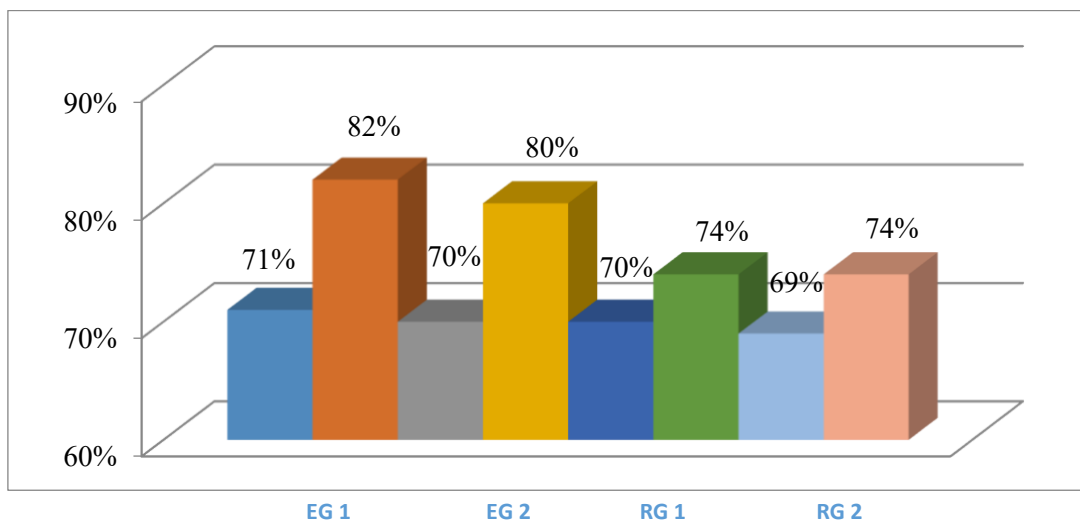

Figure 02. Level of development of analytical skills

Similar range of results was demonstrated by experimental and reference groups in terms of developing their analytical skills (Figure 03). By measuring analytical skills we meant the ability to successfully perform analytical work with the texts: analyze its structure, define key points, formulate the main idea etc. At the beginning all four groups had about 70% on that aspect; however, by the end of the course experimental groups showed better dynamics and increased their level up to 81% percent on average, while reference groups managed to achieve only the level of 74%.
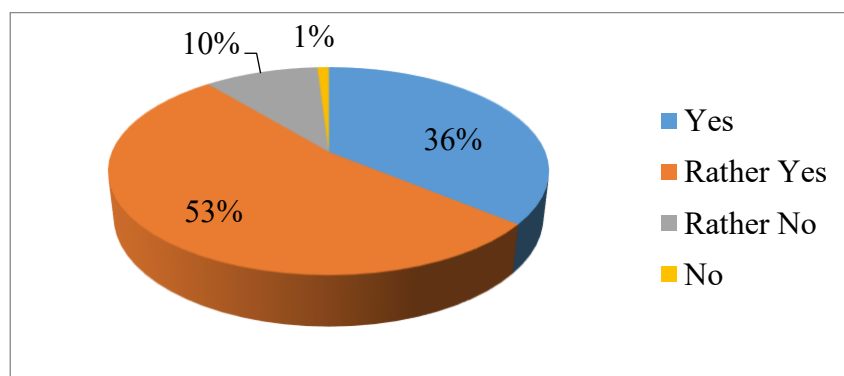

Figure 03. Students` willingness to use infographics in the framework of self-study

After completing the course students were asked to answer several questions with the help of questionnaire. One of the questions was about students willingness to use infographics in self-study while, for instance, preparing presentations (Figure 03). As we can see, the majority of students stated their willingness to use infographics as a learning tool in the future.

7. Conclusion

We see the essence and perspectives of cognitive-visual technology in shifting the emphasis from an exclusively illustrative function to the development of its educational and cognitive function.

Infographics as a tool of cognitive-visual technology has a number of advantages that can be used in higher education to increase the motivation and activization of student learning activities. In our opinion, this will be especially relevant in the face of a low level of foreign communicative competence, large groups and a lack of classroom hours which leads to a decrease in the students' motivation.

The use of infoposters gives an opportunity to meet the needs and requirements of the current generation, increase their motivation and consequently allows to make educational process more effective.

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