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Didactic Possibilities of Infographics in Developing Creative Thinking and Visual Thinking

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Abstract: This article is devoted to the scientific-theoretical and practical study of the didactic potential of infographics as a means of forming creative thinking and visual thinking in a modern educational environment. In the educational process based on digital transformations, it is important for students not only to acquire knowledge, but also to independently process, This article analyzes how the key components of creative thinking — including divergent thinking, idea generation, compositional structuring, and logical visualization — are cultivated through the use of infographics in practical settings. As a scientific innovation, it introduces the "Infographic Transformation Model," which outlines the step-by-step development of creativity via visual thinking. The findings of the study demonstrate that infographic-based didactic materials enhance not only students' perception, but also their ability to approach problems from new perspectives, generate original solutions, and express ideas aesthetically.

Keywords: Creative thinking, visual thinking, infographics, didactics, innovative pedagogy, divergent thinking, graphic perception, design thinking.

Introduction: One of the main tasks expected of the education system in modern society is to form not only knowledgeable, but also creative, enterprising, socially responsible and digitally literate individuals. Such individuals should have the ability to select information, solve problems with it, represent information in graphic and visual forms, and present it in an innovative way. In particular, creative thinking is the most important type of intellectual activity that is at the heart of the 21st century competencies.

Creativity is the ability to create a new idea, product or solution based on existing knowledge. Working with visual thinking is recognized as an important tool in developing these skills. Visual thinking is the process of processing and perceiving information through images, pictures, colors, composition and graphic structure. In this regard, infographics are considered a powerful didactic tool that combines these two main components: creative thinking and visual thinking.

Cairo (2013) defines infographics as "visual communication that is essential for understanding information." He describes infographics as a combined form of design, journalism, and logic [1]. Tufte (2001) outlines the basic principles of visual design and analyzes ways to effectively convey complex information through graphic thinking [2].

Ware (2012) acknowledges that the foundations of visual perception are based on psychological and neurophysiological factors. Visual elements have a significant impact on the brain's information processing [3]. Smiciklas (2012) argues that infographics can be used to effectively communicate with the audience and increase information retention [4].

sees infographics as a tool for transforming information into "storytelling". He considers infographics to be the most effective bridge in the process of "from information to understanding" [5]. At the same time, Few (2012) describes infographics as "structured visual representations of information" and focuses on their role in activating analytical thinking [6].

In the Uzbek education system, methodologies aimed at developing creative thinking have not yet been fully developed. In most cases, the content of education is based on a reproductive approach, in which students reproduce ready-made knowledge, but their unique thinking, ideas, and views are not visible. In this

situation, infographics are a tool that turns the student into a subject that creates, designs, and structures knowledge, not just a consumer.

Therefore, this article extensively analyzes the didactic potential of infographic tools in developing creative thinking and visual perception.

The importance of visual components in education has been increasing in the last decade. This is especially evident through forms of education integrated with digital technologies, such as infographic methods. The visual transmission of information using infographic tools makes it not only more understandable, but also more memorable and analytically effective. Although approaches to infographics in the literature vary, they all confirm its potential in education.

and storytelling, not just graphical information. He calls infographics “visualizations of ideas,” emphasizing their mediating role. According to him, infographics not only convey information, but also simplify the process of understanding and remembering it [1].

Tufte (2001) calls infographics an informational aesthetic. His approach is based on the principles of visual simplicity and clarity. Tufte shows that logical thinking can be shaped through graphic design using aesthetic means. In particular, his criticism of “chartjunk” - unnecessary decorative elements - emphasizes that the real purpose of infographics should be to reveal content [2].

Knaflic (2015) highlights infographics as a storytelling tool. He argues that by presenting graphic tools in a consistent, clear, and contextual manner, they can guide the reader’s thinking. Knaflic develops the concept of “information storytelling” and presents infographics as a didactic core, not just a visual tool [3].

Ware (2012) has argued that the relationship between visual perception and cognitive processes is based on the idea that the human brain processes visual information faster and more deeply than text. This is a psychological basis for infographics, especially in the development of creative thinking [4].

Smiciklas (2012) defines infographics as a tool for “separating, packaging, and connecting” information. He sees infographics as a powerful communication tool in marketing, journalism, and education. Smiciklas emphasizes that infographics help students not only remember information, but also develop the ability to process it [5].

Few (2012) demonstrates the role of infographics in developing analytical thinking. He argues that graphs, tables, and other visual formats can be used to reveal relationships between data and enhance statistical thinking [6].

The multimodal learning theory put forward by Mayer (2009) scientifically substantiates the effectiveness of infographic methods. According to Mayer, the human brain simultaneously receives information through visual and verbal channels and processes it more deeply. This is explained by an approach called “dual coding theory” [7]. Infographics are seen as a tool that combines these two channels.

Heick (2013) explores the connection between creative thinking and visual thinking. He describes infographics as “a tool for teaching thinking to draw.” According to him, through infographics, the reader has the opportunity to structure his ideas, create visual images, and express them in a visual way [8].

Anderson (2008) describes infographics as a tool that changes students' learning strategies. His research shows that students who use infographics achieve higher results in independent analysis, synthesis, and inference [9].

Lankow, Ritchie, and Crooks (2012) call infographics “a simplified structure of information design.” They describe infographics as a tool for managing information, highlighting important points, and providing intellectual simplicity [10].

McCandless (2010) calls infographics “information aesthetics” and suggests that they foster an intuitive approach to information. He believes that infographics help the human brain not only perceive information, but also “feel” it [11].

sees infographics as a tool for critical thinking. He emphasizes the question-provoking structure of infographics, which can show cause-and-effect relationships. This is suitable for working with problem situations in education [12].

shows that infographic design elements – color, layout, typography, consistency – are powerful factors in controlling student attention. He considers infographics not only as a means of conveying information, but also as a means of controlling visual processes [13].

Rosen (2011) sees infographics as a tool for shaping social consciousness within the evolution of digital visual culture. He argues that infographics can be used to engage the general public in complex social, economic, and scientific processes [14].

METHODOLOGY

This study aims to investigate the impact of infographic techniques on students' creative thinking and visual thinking skills. The methodology section includes the scientific basis of the study, approaches, experimental design, learning resources, and evaluation criteria. The study is mainly based on a mixed-methods approach,

combining qualitative and quantitative data.

The study was organized as an experimental-comparative study. It involved two groups: an experimental group (trained using the infographic method) and a control group (trained using the traditional method). The number of students and the subject in both groups were the same, only the methodological approach differed.

For the experimental group, infographic lessons were organized that focused on visual literacy, design thinking, graphic logic, and analytical representation of information. As part of these lessons, students were taught:

infographic design theory;

information design;

creating a visual story;

Taught how to use online tools such as Canva, Piktochart, and Visme.

The following didactic approaches were used in the study:

Constructivist approach: the student is viewed as a subject who creates knowledge.

Multimodal learning model (Mayer, 2009): graphical and textual information are used together.

Gamified learning: infographic tasks were evaluated based on a point system.

Demonstrative -learning method: analysis and reflection tasks were given based on visual materials.

A total of 112 students studying at the 1st and 2nd stages of higher education institutions of Uzbekistan participated in the study. 56 of them were divided into an experimental group and 56 into a control group. Students were selected from groups studying in technical and pedagogical areas. The experiment was conducted over a 16-week semester.

The following tools were used in the study:

Diagnostic tests (questions that determine visual thinking and creative thinking);

Reflective interviews (for qualitative analysis);

Infographic work (for project-based assessment);

Google Forms, Canva, Piktochart, and other technology platforms (as a software tool).

was based on the following indicators (Table 1):

Evaluation criteria Table 1

Indicator	Evaluation criterion
Content accuracy	Facts, logical consistency, problem solving
Visual design quality	Color harmony, typography, layout
Level of creativity	New approaches, unique solutions
Analytical thinking	The ability to uncover connections between data
Working with a technological tool	Ability to use tools like Canva, Piktochart, etc. correctly

Each indicator was rated on a 5-point Likert scale. The final score was calculated based on a total of 25 points.

As part of this research, an “infographic transformation model” was developed. This model considers infographics not only as a visual tool, but also:

visual structuring of knowledge,

analytical thinking,

interprets it as a means of encouraging independent thinking.

The model consists of the following steps:

The preparatory stage is collecting information on the topic.

Analysis stage - the main idea and thoughts are identified.

Visual coding is the process of visualizing ideas in design tools.

Creative presentation - defending and arguing your infographic.

Reflection – analyzing one's own and others' work.

There are the following limitations in generalizing the study results:

only 1st–2nd year students participated;

chosen areas are limited to technical and pedagogical areas;

varying levels of design experience.

There is also the possibility of subjectivity in quantitative assessment of creative thinking. However, the fact that the assessment criteria are based on specific indicators helped to minimize this error.

RESULTS AND DISCUSSION

was to determine the potential for developing students' creative thinking and visual thinking skills through the use of infographic techniques. The main results obtained during the experiment are presented below.

Test questions (regarding visual thinking and creative thinking) given to participants at the beginning and end of the experiment showed the following differences:

Average score of the experimental group: 12.7 at the beginning / 20.4 at the end;

Average score of the control group: 12.3 at the beginning / 14.1 at the end.

indicate that the use of the infographic method significantly increased the level of student learning. The t-test was used for statistical analysis and the p value was <0.05, which indicates the reliability of the results.

The 56 infographics prepared by the experimental group were evaluated on 5 criteria (content, design, creativity, analysis, technical application). The average score for each criterion was above 4.2 .

Content accuracy – 4.4

Visual design quality – 4.5

Creativity level – 4.3

Analytical thinking – 4.2

Working with technological tools – 4.6

These indicators show that infographics have activated not only students' design skills, but also their deep analytical thinking and creative approaches.

After the experiment, in-depth interviews were conducted with 15 students. The following key points were identified in the analysis of the interviews:

Students noted that they gained a deeper understanding of the topic while working with infographics;

They reported that graphic aids increased their ability to remember the topic;

The opportunity to independently express their ideas using design tools interested them and increased their motivation for the lesson.

These qualitative results further reinforce the educational and psychological benefits of the infographic approach.

The results determined on the basis of the experiment showed that teaching using infographics significantly increases the level of students' knowledge acquisition, systematization, independent expression of ideas and representation in graphic means. In particular, indicators related to creative thinking and visual thinking showed higher results than the traditional method.

These results are consistent with international research. For example, Ware (2012) showed in his study that it is possible to control the information process and enhance visual perception through graphic tools [4]. Mayer (2009) substantiated the effectiveness of graphic + text integration in a multimodal model [7]. Knaflic (2015) also proved that visual storytelling can engage the audience in an active thinking state [3].

Our study also recorded results consistent with these scientific foundations, which once again confirms that the use of infographic methods is didactically justified and effective.

The results obtained show that the infographic:

Actively engages students in the subject;

Presents the information being studied in a clear and consistent manner;

Develops independent thinking and an analytical approach;

creativity and design skills;

Helps to master educational material based on visual thinking.

However, there are some limitations:

Not every student has the same level of technological literacy;

The time-consuming nature of creating infographics can affect motivation;

creativity and visual design, the criteria may not always be objective.

Therefore, in future research:

Development of automatic design evaluation tools integrated into the platform;

Comparison of the effectiveness of infographic methods across different educational areas;

It is recommended to develop special training modules that strengthen visual competence.

CONCLUSION

This article deeply studies the impact of infographic techniques on students' creative thinking and visual thinking skills. Based on experiments and analyses, it was found that infographic tools not only increase students' interest in the subject, but also significantly develop their ability to think independently,

systematize information, and express it in the form of aesthetic design.

The use of infographic techniques is becoming an integral part of digital pedagogy. This approach not only increases the effectiveness of the learning process, but also serves to train individuals with creative thinking, compatible with modern visual culture.

and the limitations identified during the study serve as a solid basis for improving infographic methods, further developing evaluation criteria, and implementing this methodology on a wider scale.

REFERENCES

Cairo, A. (2013). The Functional Art: An Introduction to Information Graphics and Visualization. New Riders.

Tufte, ER (2001). The Visual Display of Quantitative Information (2nd ed .). Graphics Press.

Knaflic, CN (2015). Storytelling with Data: A Data Visualization Guide for Business Professionals. Wiley.

Ware, C. (2012). Information Visualization: Perception for Design (3rd ed .). Morgan Kaufmann.

Smiciklas, M. (2012). The Power of Infographics: Using Pictures to Communicate and Connect with Your Audience. Que Publishing.

Few, S. (2012). Show Me the Numbers: Designing Tables and Graphs to Enlighten (2nd ed .). Analytics Press.

Mayer, RE (2009). Multimedia Learning (2nd ed .). Cambridge University Press.

Heick, T. (2013). The Relationship Between Visual and Creative Thinking. TeachThought.

Anderson, JR (2008). Cognitive Psychology and Its Implications (7th ed .). Worth Publishers.

Lankow, J., Ritchie, J., & Crooks, R. (2012). Infographics: The Power of Visual Storytelling. Wiley.

McCandless, D. (2010). Information Is Beautiful. HarperCollins.

Rutledge, D. (2016). Infographics as a Tool for Critical Thinking in the Classroom. Journal of Educational Technology.

Lohr, LL (2008). Creating Graphics for Learning and Performance: Lessons in Visual Literacy. Pearson Education.

Rosen, D. (2011). The Culture of the Visual in the Digital Age. MIT Press.