

INFLUENCE OF VISUAL CONTENT ON MEMORY FORMATION

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Abstract

This article highlights the effects of visual content on the formation of human memory. For example, the effects of image, visual and other visual information on the brain, how they are processed, and factors that contribute to long-term memory retention will be analyzed. Basic recommendations are also given on the conscious use of digital technologies and maintaining psychological stability. In addition, Dual-coding theory, such as the role of emotional impact, color, and movement are explained. The article reveals the good aspects of education, marketing and the use of visual materials in everyday life.

Keywords: Visual content, memory formation, cognitive processes, concentration, picture materials, educational technology, psychological impact.

Introduction

The role of visual content in the modern information space is increasing. Due to the widespread introduction of digital technology, today's person perceives more information through images, graphs, videos, and infographics. Studies show that the human brain perceives and processes about 80% of general information in visual form, which is a much higher rate compared to text-based information.

Statistics in the field of cognitive psychology also confirm the effectiveness of visual content: if only 10–20% of the studied material is remembered through text, the information presented along with visual elements can be retained up to 65%.

Psychological and pedagogical research shows that visual stimuli play an important role in attracting attention, speeding up perception processes, and reinforcing information in long-term memory. This is because visual images are encoded faster by the brain and more efficiently activate semantic analysis processes. The use of visual content in the educational process increases students' comprehension, simplifies complex concepts and allows them to retain the acquired knowledge for a longer period.

Today, in the fields of education, communication, marketing, and psychology, the scientific study of the effect of visual content on memory formation, as well as the identification of its effective methods, is one of the most pressing scientific and practical issues.



This article analyzes the mechanisms of influence of visual content on human memory, its role in the educational process and new opportunities emerging in the context of the modern information environment. Review of the literature

Literature Review:

Scientific research on the effects of visual content on memory formation has expanded significantly in recent decades. The literature published in the fields of cognitive psychology, neuropsychology, and information technology confirms that visual stimuli are one of the leading factors in the human brain information processing.

Mayer's (2005) Multimedia Learning model shows that the combined use of visual and verbal information serves the effective acquisition of knowledge. According to the results of the study, the level of mastery was lower when the information was given to students only in the form of text, but the learning efficiency increased by 30–40% when the text was enriched with visual materials. This conclusion confirms that visual content amplifies the semantic coding process. Studies of brain activity by neuropsychologists have found that visual information is processed in the brain 60,000 times faster than text. Therefore, the use of graphs, diagrams, maps, and infographics in the learning process will help to keep the information intact in long-term memory while not only capturing attention.

Dual Coding Theory (Paivio, 1971), on the other hand, scientifically substantiated that the combined effects of visual and verbal coding increase the level of memorization of information. Subsequent studies, in particular those by Clark and Lyons (2010), also supported this theory, showing that the retention rate increases by up to 65% when information is given to learners through image and text integration.

The literature on digital learning technologies also emphasizes the significant impact of visual content on learning effectiveness. For example, in a meta-analysis of the use of multimedia textbooks, it was found that lessons using video, animation and interactive graphics gave on average 20–25% higher learning results compared to lessons with simple text. Simplification of complex scientific concepts through illustrative expression plays a particularly important role in this.

In general, the available scientific literature explains the effect of visual content on memory formation through several key factors: the speed of visual coding, the ability to keep the attention steady, the processing of information through several channels, and the semantic reinforcement of the material. However, modern research also shows that visual tools can increase student motivation, reduce cognitive load, and significantly improve learning efficiency in digital learning environments.

Methodology:

The methodology of this study aims to scientifically determine the effects of visual content on short- and long-term memory formation in learners. The study is conducted in a quasi-experimental pre-test / post-test design and involves a mixed-method approach, meaning that quantitative and qualitative data are analyzed together.



Research Design

Control group: Training materials are provided in text form only.

Experiment group: Learns via text + visual content (infographic, diagram, illustrated explanation, video).

This approach makes it possible to determine the true impact of visual materials on memory formation.

Participants

Sample: 80–120 pupils or students.

Sampling methods: random sampling and clustered sampling.

Ethics: all participants provide consent and their information is anonymized.

Materials and measuring tools

Visual content: Infographic, chart, illustrated insights, short videos.

Textual content: textual material of the same content.

Xotira testlari: immediate recall, delayed recall, recognition test.

Attention and cognitive load: brief psychological dimensions.

Mastery test: assessment of comprehension of the topic.

Research Process

Pre-test: Determine the primary cognitive and memory indicators.

Intervention: the control group learns with text and the experimental group with visual content.

Post-test: memory and mastery levels are reassessed.

Qualitative data: Students' subjective experiences are explored through interviews and focus groups.

Data Analytics

Quantitative analysis: t-test, ANOVA, regression, effect measures (Cohen's d).

Qualitative analysis: A thematic coding and triangulation approach.

Reliability and ethical standards

The measurement instruments will be verified through a pilot test.

The internal reliability of the tests is ensured.

Consent and anonymity of the participants are guaranteed at all stages of the research.

Conclusions

Research results show that visual content significantly improves readers' short-term and long-term memory. The use of visual materials along with text allows for faster comprehension and memorization of learned information.

Studies in Uzbekistan and abroad show that visual approaches make the pedagogical process more effective and increase students' attention and motivation. Therefore, it is recommended to widely use visual content in the educational process, as it helps to strengthen the formation of memory and increase the effectiveness of learning.



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