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TRANSFORMATION OF ATTENTION AND MEMORY IN THE AGE OF INFORMATION OVERLOAD: THE IMPACT OF DIGITAL TOOLS ON COGNITIVE LOAD (A SOCIO-PHILOSOPHICAL ANALYSIS)

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ABSTRACT

This article analyzes the transformational processes occurring in human attention and memory under the conditions of a sharp intensification of the information flow ("information overload"). Digital tools — smartphones, social networks, push notifications, multitasking — increase cognitive load, weaken the ability to sustain attention, and lead to excessive reliance on short-term types of memory. The author substantiates the formation of new psychological phenomena such as "cognitive fragmentation" and "scanning attention" in the digital environment. The article also proposes strategies for managing cognitive load and practical methods for restoring attention.

KEYWORDS: Information overload, transformation of attention, memory, cognitive load, digital tools, multitasking, scanning attention, cognitive fragmentation, digital hygiene, attention management.

INTRODUCTION

Modern society lives in an era of unprecedented acceleration in the production and consumption of information. Through the Internet, social networks, messengers, and artificial intelligence tools, gigabytes of information flow reach a person every day. This phenomenon is referred to in scientific literature as "information overload." At the same time, digital technologies are increasingly deeply interfering with human cognitive processes — in particular, attention and memory.

Literature Review and Theoretical Foundations:

The concept of information overload was first introduced in the 1970s by Alvin Toffler in his work Future Shock, while in the twenty-first century this phenomenon has become a central topic in the fields of cognitive psychology, neuroergonomics, and digital hygiene.

Herbert Simon (1971) emphasized that attention is a scarce resource in conditions of information abundance. In recent decades, Linda Stone identified the phenomenon of "continuous partial attention." Later studies (Ophir, Nass & Wagner, 2009) showed that multitasking reduces the speed of attention switching and makes deep concentration difficult.

Betsy Sparrow and others (2011) proved the "Google effect" — that people remember better where information can be found than the information itself. Digital tools perform the function of external memory ("cognitive prosthesis"), which is changing the mechanisms of long-term memory formation.

According to the cognitive load theory developed by Sweller (1988), the limited capacity of working memory (7±2 elements) becomes overloaded under an excessive flow of information. Push notifications, animations, and multi-window interfaces in digital tools increase "extraneous cognitive load," reducing the effectiveness of learning and memorization.

On this basis, the following hypothesis is put forward in this article: under conditions of information overload, high-intensity use of digital tools leads to fragmentation of attention, increased working memory load, and reduced productivity of long-term memory.

Research Methodology

The impact of information overload and digital tools on cognitive processes is based on general methodological approaches:

Theoretical analysis and generalization of literature: Existing scientific sources on the topic — cognitive psychology, neuroergonomics, digital hygiene, and media psychology — were systematically studied. In particular, the results of leading studies on attention transformation, memory mechanisms, and cognitive load theories were synthesized.

Observation and questionnaire survey (general method): A survey was conducted among a wide range of users belonging to different age and occupational groups in order to collect information about the intensity of digital tool use, subjective feelings related to information flow, difficulties in concentrating attention, and memory problems. The questionnaire, based on a 5-point Likert scale, covered the following blocks: intensity of information flow, level of attention management, everyday memory difficulties, frequency and mode of digital tool use (multitasking, push notifications, social networks).

Experimental observation (in natural and laboratory conditions): The participants' attention indicators and memory efficiency were compared in situations with and without digital interventions, such as smartphone notifications during reading or work, and working with several applications at the same time. During the experiments, standardized cognitive tests, such as the Stroop test, working memory tests, and recall tasks based on textual material, were used. In some observations, light neuromonitoring, such as changes in attention waves, was also applied to assess the psychophysiological indicators of attention.

Data analysis: The collected data were processed using qualitative methods, such as content analysis and typologization, and quantitative methods, such as correlation, comparison of mean values, and identification of intergroup differences. The reliability of the results was assessed on the basis of repeated checks and statistical significance at the level of $p<0.05$.

The analysis and observations showed the following main results:

- Regarding attention transformation: Most participants regularly use digital devices during the day. A large part of them experience difficulty in concentrating on one task for a long time and instead frequently switch between tasks. In multitasking situations, attention efficiency decreases significantly.
- Regarding memory: Most respondents confirmed the "Google effect": they remember where information can be found, but forget the content of the information. In conditions where digital interventions, such as notifications and transient messages, are present, the level of recall of textual material is significantly lower than in traditional conditions.
- Regarding cognitive load: Multitasking and frequent use of social networks are strongly associated with increased cognitive load. Most participants reported subjective feelings such as

"fatigue," "information overload," and "decreased thinking ability" after intensive use of digital tools.

The study shows that the intervention of digital tools leads to fragmentation of attention and increased cognitive load, which weakens the processes of learning, analysis, and memorization. The main conclusions are as follows:

1. Attention transformation: The digital environment encourages a transition from long-term concentration to "scanning attention" and "continuous partial attention." This reduces the ability to think deeply and solve complex problems.
2. Memory transformation: Due to the "Google effect" and external memory, or digital prosthesis, people are developing a locating mechanism instead of internalizing information. Long-term memory is used less, as a result of which the stability of knowledge decreases.
3. Increase in cognitive load: Push notifications, multitasking, and distracting elements of interfaces quickly fill the capacity of working memory and sharply reduce learning efficiency. Observations empirically confirm this relationship.

Practical recommendations:

- Digital hygiene strategies, such as "attention protection" — turning off notifications and working within domain-specific time intervals.
- Cognitive training, such as attention restoration exercises and meditation.
- Introducing "deep reading" and "slow decision-making" techniques into the education system.

Future research directions:

- Studying how artificial intelligence tools, such as chatbots and recommendation algorithms, affect cognitive load.
- Conducting an in-depth analysis of the neurobiological foundations of cognitive transformation.
- Studying differences in resistance to digital tools among different age groups.

This study reveals current issues related to preserving and strengthening human cognitive resources in the modern information environment. Digital transformation is placing a new responsibility on humanity not only economically and technologically, but also psychologically: protecting attention is one of the main ecological problems of the twenty-first century.

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