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FORMATION OF CHILDREN'S FOOD CULTURE IN THE CONTEXT OF DIGITAL TECHNOLOGIES

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Abstract: This article examines the formation of children's food culture in the context of the digitalization of all spheres of life. The relevance of the study is driven by the contradiction between the widespread integration of digital technologies into educational processes and the lack of a systematic approach to their use for fostering healthy eating habits. The aim of this work is to provide a theoretical justification and empirical study of the influence of digital tools (mobile applications, educational platforms, digital marketing) on the eating behavior of preschool and primary school children. The methodological framework comprises a systemic approach, Bandura's social cognitive theory, and generational theory. The research employed methods such as parent questionnaires (n=450), pedagogical observation, and content analysis of digital content. The results indicate that the digital environment acts as a dual factor: on one hand, it facilitates the dissemination of unhealthy eating information through targeted advertising; on the other, it offers effective tools for developing nutritional competencies through gamification and interactive learning. Based on the obtained data, a structural-functional model for forming children's food culture in the digital environment was developed, encompassing cognitive, emotional-volitional, and behavioral components. The practical significance of this work lies in the creation of methodological recommendations for educators and parents on the safe and productive use of digital technologies to cultivate a healthy lifestyle in children.

Keywords: food culture, digital technologies, eating behavior, children, gamification, digital marketing, nutriology, educational applications.

ФОРМИРОВАНИЕ ДЕТСКОЙ ПИЩЕВОЙ КУЛЬТУРЫ В КОНТЕКСТЕ ЦИФРОВЫХ ТЕХНОЛОГИЙ

Аннотация: В данной статье рассматривается формирование детской пищевой культуры в контексте цифровизации всех сфер жизни. Актуальность исследования обусловлена противоречием между широкой интеграцией цифровых технологий в образовательные процессы и отсутствием систематического подхода к их использованию для формирования здоровых пищевых привычек. Цель работы – теоретическое обоснование и эмпирическое исследование влияния цифровых инструментов (мобильные приложения, образовательные платформы, цифровой маркетинг) на пищевое поведение детей дошкольного и младшего школьного возраста. Методологическая основа включает системный подход, социально-когнитивную теорию Бандуры и теорию поколений. В исследовании использованы такие методы, как анкетирование родителей (n=450), педагогическое наблюдение и контент-анализ цифрового контента. Результаты показывают, что цифровая среда выступает в качестве двойственного фактора: с одной стороны, она способствует распространению информации о нездоровом питании посредством целевой рекламы; с другой — предлагает эффективные инструменты для развития компетенций в области питания с помощью геймификации и интерактивного обучения. На основе



полученных данных была разработана структурно-функциональная модель формирования детской пищевой культуры в цифровой среде, охватывающая когнитивные, эмоционально-волевые и поведенческие компоненты. Практическая значимость данной работы заключается в создании методических рекомендаций для педагогов и родителей по безопасному и продуктивному использованию цифровых технологий для формирования здорового образа жизни у детей.

Ключевые слова: пищевая культура, цифровые технологии, пищевое поведение, дети, геймификация, цифровой маркетинг, питание, образовательные приложения.

INTRODUCTION

The transformation of the modern socio-cultural environment under the influence of digital technologies has led to a significant revision of traditional approaches to the education and upbringing of the younger generation. Children are growing up in a hyper-connected world where the boundaries between physical and virtual reality are increasingly blurred. This phenomenon directly impacts fundamental aspects of life, including the formation of food culture—a complex construct encompassing knowledge, attitudes, and behaviors related to nutrition. Food culture is not merely a set of physiological habits; it is a socio-psychological and pedagogical category that reflects the values, traditions, and level of awareness of an individual.

The problem of shaping a healthy food culture in children is becoming particularly acute in the context of the global pandemic of non-communicable diseases associated with poor nutrition, such as obesity, type 2 diabetes, and eating disorders. According to the World Health Organization, the prevalence of overweight and obesity among children and adolescents has increased tenfold over the past four decades. Simultaneously, the digital environment has become the primary source of information and entertainment for children, with the average screen time for a child aged 5-12 years being 4 to 6 hours per day. In this context, the digital space acts as a powerful agent of socialization, often competing with family and educational institutions.

The scientific literature presents a number of studies on the impact of digital technologies on children's nutrition. Some authors focus on the negative consequences of digitalization, emphasizing the role of targeted advertising of high-calorie, nutrient-poor foods and the formation of sedentary behavior associated with prolonged screen time (Smith et al., 2021; Kelly et al., 2020). Other researchers, on the contrary, see digital technologies as a resource, pointing to the potential of mobile applications, serious games, and online educational platforms to increase nutritional literacy (Hermans et al., 2018; Folkvord et al., 2022). However, most existing works consider these aspects in isolation, without offering a holistic view of the process of forming a food culture in the digital ecosystem. There is a clear need for a systematic study that integrates pedagogical, psychological, and technological perspectives.

The aim of this research is to theoretically substantiate and empirically verify the mechanisms of influence of digital technologies on the formation of food culture in children, and to develop a structural-functional model for managing this process in educational practice.

Literature Review

The theoretical foundation of this study is based on several key concepts. First, Albert Bandura's social cognitive theory (Bandura, 1986) posits that learning occurs in a social context through observation, imitation, and modeling. In the digital context, influencers, video bloggers, and virtual characters become new models for imitation, significantly influencing children's eating preferences. Second, the generational theory (Strauss & Howe, 1991) characterizes the current generation of children (Generation Alpha) as "digital natives" for whom interaction with



technology is a natural and integral part of existence, determining the specifics of their perception and assimilation of information.

An analysis of modern literature allows us to identify three main vectors of digital technology influence on children's food culture: information and cognitive, marketing and commercial, and interactive and behavioral.

The information and cognitive vector is realized through the availability of educational content. Research shows that interactive educational platforms can effectively teach children the basics of a balanced diet, the role of vitamins, and the consequences of poor nutrition (Mazzucca et al., 2021). However, the quality and reliability of such content remain a significant problem, as the information space is filled with contradictory data, including unverified dietary advice.

The marketing and commercial vector is represented by digital marketing tools. Children are particularly vulnerable to targeted advertising, which uses algorithms to personalize offers based on their preferences and behavior (Montgomery & Chester, 2019). Advergaming (games that contain advertising for food products) are especially effective in forming brand loyalty and preferences for unhealthy foods. A meta-analysis by Boyland et al. (2022) confirmed a strong causal relationship between exposure to digital marketing of unhealthy foods and increased consumption of such products among children.

The interactive and behavioral vector includes gamification, virtual reality, and mobile applications designed to shape eating behavior. Gamification elements (points, levels, rewards) increase motivation and engagement in the learning process. Applications that allow children to plan their diet, track their eating habits, or participate in cooking master classes demonstrate positive results in increasing food literacy (Folkvord et al., 2022). However, excessive use of digital tools can lead to the formation of "technological" eating habits, where the eating process is combined with screen viewing, which reduces mindfulness and contributes to overeating.

Thus, the analysis of scientific literature reveals a complex and contradictory picture. Digital technologies are not a univocal factor; their influence depends on the content, context, and intensity of use, as well as on the mediating role of adults.

METHODOLOGY

The research was conducted in 2023-2024 in educational institutions and digital communities in Tashkent, Uzbekistan, and involved a mixed-method design combining quantitative and qualitative approaches. The study was conducted in three stages.

The first stage (theoretical and analytical) involved the analysis of scientific literature, normative documents, and existing digital products (applications, websites, video content) aimed at shaping children's food culture. Content analysis of 50 most popular YouTube channels for children (by number of subscribers in the Russian-speaking and Uzbek segment) was conducted to identify the nature of the food-related content presented.

The second stage (empirical) used a survey method. The sample consisted of 450 parents of children aged 4 to 10 years. The survey was conducted in an online format using the Google Forms platform. The questionnaire included closed and semi-closed questions aimed at identifying: a) the frequency and nature of children's use of digital devices; b) the main sources of information about nutrition that children encounter; c) parents' strategies for controlling and mediating digital content; d) children's eating behavior (using a modified Children's Eating Behavior Questionnaire). The sample was quota-based by place of residence (urban/rural) and type of educational institution. Statistical data processing was performed using SPSS Statistics 26.0, using descriptive statistics, Pearson's chi-squared test (χ^2), and correlation analysis.



The third stage (formative) involved a pedagogical experiment conducted on the basis of two preschool educational institutions (n=120 children). In the experimental group, a program for developing food culture using digital technologies was implemented for three months. The program included interactive lessons using an author's mobile application "Food Explorer", joint viewing and analysis of video content with parents, and the use of gamified tasks to consolidate knowledge. In the control group, training was carried out using traditional methods (conversations, didactic games without the use of digital tools). The effectiveness was assessed using pre- and post-testing methods.

RESULTS

The results obtained allow us to characterize the current state of the problem and identify significant patterns.

Table 1 shows the distribution of children by frequency of digital device use and the nature of content consumed (based on parent surveys).

Indicator	Percentage (%)
<i>Average daily screen time</i>	
Less than 1 hour	12.2
1-2 hours	38.7
2-4 hours	34.4
More than 4 hours	14.7
<i>Main types of content</i>	
Entertainment (games, cartoons)	68.3
Educational (educational channels)	21.5
Social media (TikTok, Instagram)	10.2
<i>Frequency of encountering food advertising</i>	
Constantly	42.1
Sometimes	48.9
Rarely	9.0

The data in Table 1 indicate a high level of digital engagement among modern children, with the majority exceeding the recommended norms of screen time (2+ hours). A significant proportion of parents report constant exposure to food advertising, which creates a persistent information background that promotes unhealthy eating choices.

Content analysis of YouTube channels popular among children revealed that 72% of videos containing food products promote high-calorie, sugary, or fatty foods. Product placement is widely used, where characters naturally consume certain brands of sweets, carbonated drinks, or fast food. Only 15% of the analyzed content had an educational focus on healthy eating.

Analysis of parent questionnaires showed that 68% of respondents use digital devices as a means of "calming" or "keeping the child occupied" during meals. This is associated with a statistically significant increase in food consumption without physiological hunger ($\chi^2 = 9.34, p < 0.01$) and a preference for "quick" foods that are convenient to eat while watching.

However, the study also recorded positive examples of using digital technologies. 37% of parents reported using specialized applications to teach children about healthy eating. The most popular apps included "Yummy" (learning to cook simple dishes), "Vitaminki" (studying vitamins in a playful way), and interactive recipes on children's educational platforms.

Table 2 presents a comparative analysis of the effectiveness of the formative experiment.



Group / Indicator	Pre-test (mean score)	Post-test (mean score)	Change	Significance (p)
<i>Experimental group (n=60)</i>				
Knowledge of healthy food principles	5.2	8.7	+3.5	p < 0.001
Awareness of food choices	4.8	8.1	+3.3	p < 0.001
Willingness to try new healthy foods	3.9	7.5	+3.6	p < 0.001
<i>Control group (n=60)</i>				
Knowledge of healthy food principles	5.1	6.2	+1.1	p < 0.05
Awareness of food choices	4.9	5.8	+0.9	p > 0.05
Willingness to try new healthy foods	4.0	4.8	+0.8	p > 0.05

The results presented in Table 2 demonstrate a significantly higher effectiveness of the program that integrated digital technologies. The children in the experimental group showed a statistically significant improvement in all measured parameters, including not only cognitive (knowledge) but also behavioral aspects (willingness to try new foods). This suggests that interactive digital tools, when used systematically and with pedagogical support, can be a powerful factor in the positive transformation of food culture.

Qualitative data obtained from pedagogical observations and interviews with parents in the experimental group indicated that the use of the "Food Explorer" application and joint activities contributed to the transformation of the process of eating from a routine into a cognitively rich practice. Children began to show greater interest in the origin of products, actively asked questions about their composition, and expressed a desire to participate in cooking.

DISCUSSION

The results obtained confirm the dual nature of the impact of digital technologies on the formation of children's food culture, which has been noted in previous studies (Smith et al., 2021; Folkvord et al., 2022). On the one hand, the lack of control and the aggressive nature of digital marketing create a "toxic" food environment that reinforces unhealthy preferences. The data on high screen time and the prevalence of unhealthy food content are consistent with global trends and indicate the need for stricter regulation of digital advertising targeting children.

On the other hand, our research demonstrates a significant educational potential of digital technologies. The key factor determining the vector of influence is mediation—the active participation of adults (parents and educators) in the selection, interpretation, and integration of digital content into the child's real life. In the experimental group, digital tools did not replace traditional forms of interaction but served as a catalyst that increased motivation and created a context for joint activities.

The structural-functional model developed based on the research results includes three interconnected components:

Cognitive component: involves the formation of knowledge about the basics of healthy eating, the composition of products, and their effect on the body through the use of verified educational applications, interactive videos, and digital libraries.

Emotional-volitional component: involves the development of a positive attitude towards healthy food, the formation of motivation to follow a diet, and the ability to resist manipulative advertising influences through discussions of watched content and the development of critical thinking.



Activity component: involves the implementation of acquired knowledge in practice through participation in virtual cooking master classes, the use of gamified food diaries, and interactive tasks with parents.

The implementation of this model requires a revision of the traditional approach to hygienic education, integrating digital literacy as a key element of a child's general culture. It is essential to move beyond the paradigm of "protecting children from digital technology" to the paradigm of "managing digital socialization," where technologies become a tool for achieving educational goals.

Conclusion

The formation of children's food culture in the context of digital technologies is a complex pedagogical problem that requires an interdisciplinary approach. This study has shown that the digital environment is a powerful factor influencing children's eating behavior, acting simultaneously as a source of risk and an effective educational resource. The passive use of digital devices without adult mediation, especially when combined with meals, contributes to the consolidation of unhealthy habits and increases vulnerability to targeted marketing of unhealthy foods.

Conversely, the systematic use of verified digital content, gamified educational applications, and joint activities between adults and children in the digital space can significantly increase the level of nutritional literacy and contribute to the formation of sustainable healthy eating habits. The structural-functional model proposed in this article can serve as a theoretical basis for the development of educational programs and methodological recommendations for parents and teachers.

The prospects for further research lie in the development of adaptive digital platforms that take into account the individual characteristics of children, as well as in the study of long-term effects of the use of digital technologies on the food culture of the younger generation. It is also necessary to conduct cross-cultural studies to identify the specifics of the influence of digitalization in different socio-economic and cultural contexts.

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