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Regarding the Digitalization of the Cognitive Gaming Space of Educational Institutions

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Abstract: The modern development of digital technologies also demonstrates the relevance of its use in the educational process of children. The purpose of the article is to analyze the digitalization of the cognitive and gaming space of educational institutions, the formation of a future perspective model of their development and use. The article uses pedagogical (theoretical) and general scientific research methods: analysis, synthesis, induction, deduction, concretization, abstraction, forecasting. In the results, it is proposed to form a certain conditional model of the cognitive-game space, which will include the establishment of the necessary prerequisites, a comprehensive analysis of the spatial environment, the development and implementation of the necessary material and technical conditions, the processing of results and the elimination of shortcomings. Also, the process of understanding will take place according to the model: observation of children, survey, and determination of educational level work with documents and materials to improve and optimize the educational process. The conclusions particularly emphasize the need to develop digital competencies among children, as working with modern digital technologies will require special skills, given the fact that digital technologies are constantly improving.

Keywords: digitization, spatial and game environment, education, raising children.

Introduction

Children's aspects of the activity in elementary school and preschool age are cognitive, visual (drawing, modeling, applique, constructing), musical, and play. In the conditions of digitalization, play activity acquires special importance in the development of children, which, due to its important contribution to the emotional, social, physical, intellectual, and volitional development of children, is considered leading, among others. At the same time, the development of modern technologies of information society dictates new requirements for the functioning of already established forms of learning and the creation of its new varieties. The COVID-19 pandemic and related quarantine restrictions have added extra impetus to the emergence and active use of digitalization in the learning process. This trend has become common in educational environments and has been particularly reinforced by decisions on the equality of traditional and distance forms of education. Also, this vector of development embraced preschool and school educational systems, as they experienced extreme influence and limitations on the pandemic. Institutions of higher education have reoriented their activities with an emphasis on the independent education of applicants (students), while schools and primary schools cannot focus solely on independent work and require other mechanisms of response.

One of the effective ways out was to turn not just to the distance form of education, but also to experiment with alternative methods of constructing the lesson. The form of using game environments is one of the important aspects of organizing the work of a modern educational institution. Their evolution is not complete, as the current state is influenced by the latest technologies and opportunities for their use. Accordingly, it makes education, in general, more digitalized, and the creation of cognitive-game space becomes more digitalized than before. These trends form the relevance of the element under study.

Researchers have partially explored the proposed issue. For example, Clark et al. (2020) actualized issues related to the future upbringing and learning of children, noting the digital segment. The virtual learning game environment was explored by Chukusol et al. (2022). Separate aspects of the effectiveness of conventional and digital games in the teaching and learning process were traced by Tatli (2018). Gashaj et al. (2021) highlighted potential vectors for the development of virtual games in kindergarten and other preschool environments. At the same time, such an important and relevant issue as an attempt to build a working model of cognitive-game space, which in connection with the latest systems of distance and blended learning passed the attention of researchers is an extremely important and catalyst.

Research Problem

Actual personal development of children occurs in accordance with the familiarity with play activities at different levels, which also involves the formation of play competencies among preschoolers and primary school-age children. Completion of play competencies is evidenced by children's ability to show activity freely, emotionally, and richly, spontaneously on their own initiative. Thanks to it, it is possible to realize and use new information available for assimilation and personal experience. Achievement of personal development is provided by children's aspiration to participate in adult life through the possibility of realization of interests in the course of play and role-playing activities in common forms. Realization of a difficult task requires sufficient knowledge of work methods and skills from teachers and caregivers, thanks to which the use of game technologies becomes effective in using.

Research Focus

The main attention in the study is paid to the possibility of forming a model of cognitive and playful space. In practice, this will allow to implement and realize certain measures to improve the quality of school and preschool education, which in general will help to meet the requirements of the modern information society. It should be noted that the study also considers possible problematic issues that are bound to appear in the application of best practices of game techniques. Such construction of the study will unambiguously contribute to the further practical implementation of the research results and its main conclusions.

Research Aim and Research Questions

The main purpose of the article is to analyze the digitalization of the cognitive-game space of educational institutions, the formation of a future promising model for their development and use. Particular attention will also be paid to the problems of introducing digitalization in the educational space. At the same time, the recommendations obtained will improve the organization of the educational process, taking into account the possible continued use of distance learning, which is associated with quarantine measures and the specific functioning of educational institutions during this period, to harmonize the implementation of game techniques with modern requirements of training and education.

Research Methodology

General Background

The methodology that was used in this article research comes from the practice of analytical searches and relevant review of the most appropriate results that have significant potential for the implementation of digital cognitive-game space.

Consequently, the work is formed based on pedagogical (theoretical) and general scientific methods of research. Among the general-scientific, notable importance was the use of analysis, synthesis, induction, deduction. Among the special methods of pedagogical knowledge - specification, abstraction, prediction, etc.

Instrument and Procedures

As a result of the use of analysis, the main subject of the study (the formation of cognitive and playful space) is divided into the following key issues: the characteristics of the creation of cognitive and playful space, analysis of the model of cognitive and playful space, highlighting the main problems and ways to overcome them in the digitalization of the environment. Through the lens of the use of synthesis, these elements are combined and formed their own conclusions about the future development of digital cognitive-gaming space. The work applies a systematic method based on which the cognitive and play space of children, is considered as a special system, which is transformed and develops in accordance with current trends and changes. Based on the predictive method formed methods of overcoming problems for the digitalization of the play space of the future.

The study was implemented in several stages. On the first - the relevance of the research was defined, the importance of the cognitive-game space in the system of child formation was characterized,

on the second – the key foundations of the analyzed environment were described, the models of cognitive space formation were described, on the third - the main aspects of digitalization of the cognitive-game environment of the child were defined, the main problems of its total implementation were outlined, on the last - the obtained results and formed judgments concerning the future development of the digital cognitive-game space were summarized.

Data Analysis

In the methodological principles of this study, the use of the collection of necessary information through the prism of the survey of the process under study based on conceptual observation was notable. Through the prism of content analysis, primary information about the main opportunities for the development of the digital gaming space is collected.

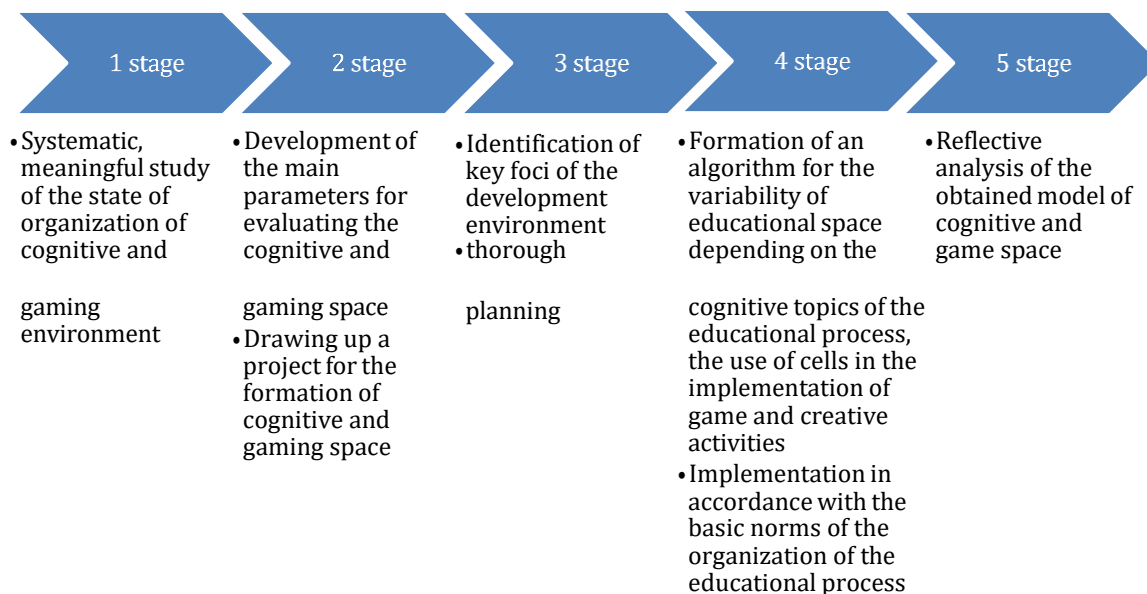
Research Results

Cognitive-game space in the educational institution should be formed in stages (Franco & DeLuca, 2019). In the first period, there is the formation and clarification of the main objectives and analysis of psychological and pedagogical, methodological, logistical tools to ensure the educational process. In the second (organizational) period it is necessary to make a project of the cognitive-playing space. Also at this stage, there is an analysis of the situation, the main problems associated with the goals of the educational institution, and participants in the educational process at the social and individual levels are identified. At the third stage, the formation of methods of organization of cognitive and playful space takes place and the concept of cognitive and playful space is developed, teachers form the main types of activities that will be applied in the process. The principle of programming is also implemented: the creation of basic programs of key activities and approaches focused on the development of cognitive and communicative abilities. At the same time, the planning stage requires thorough planning of the formation of cognitive-playing space (Kem, 2022). In addition, at this stage, there is a kind of transition from a monomodel to an integrated mixed model (Marathe, 2018). In the next period, there is the implementation of the plan in accordance with the norms of the learning process. The last plan refers to the reflective analysis and discussion of the established space.

The conditional model of the cognitive-play space as a means of influence on children is complex, consisting of several elements: prerequisites, comprehensive study of the state of the spatial environment, development of evaluation parameters, compliance with the material and technical conditions, implementation, reflection (See Figure 1).

Figure 1

Conditional Model of the Formation of Cognitive and Playful Space

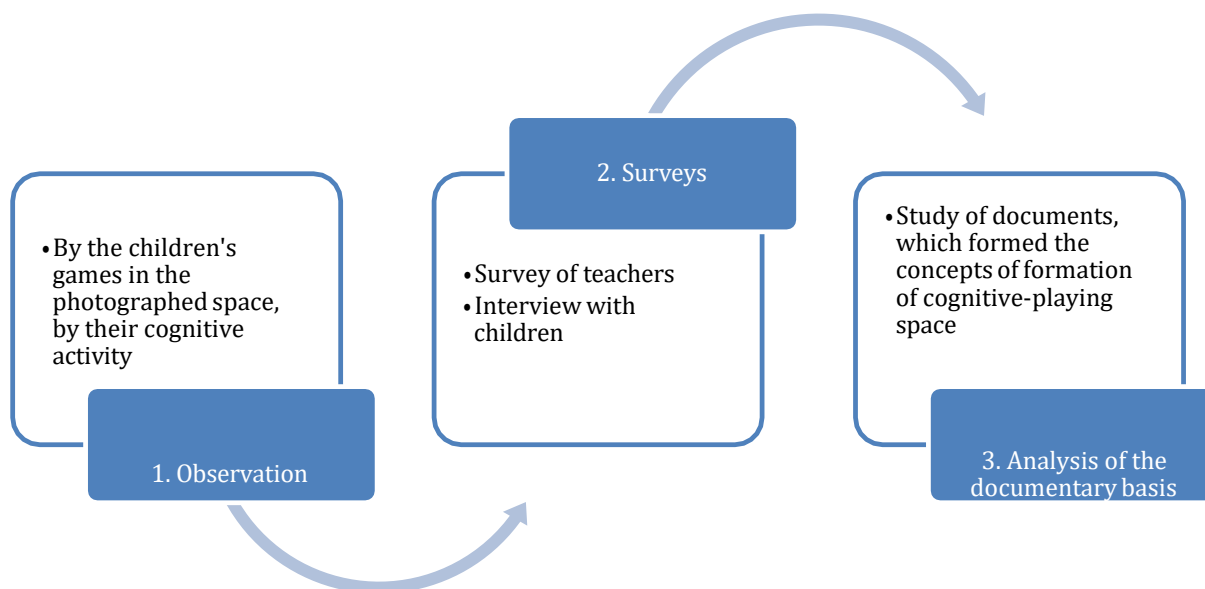


Source: authors' development.

At the same time, the process of a comprehensive study of the organization of educational and play space involves the implementation of several points (See Figure 2).

Figure 2

Model of a Comprehensive Study of the State of Organization of Cognitive and Game Space



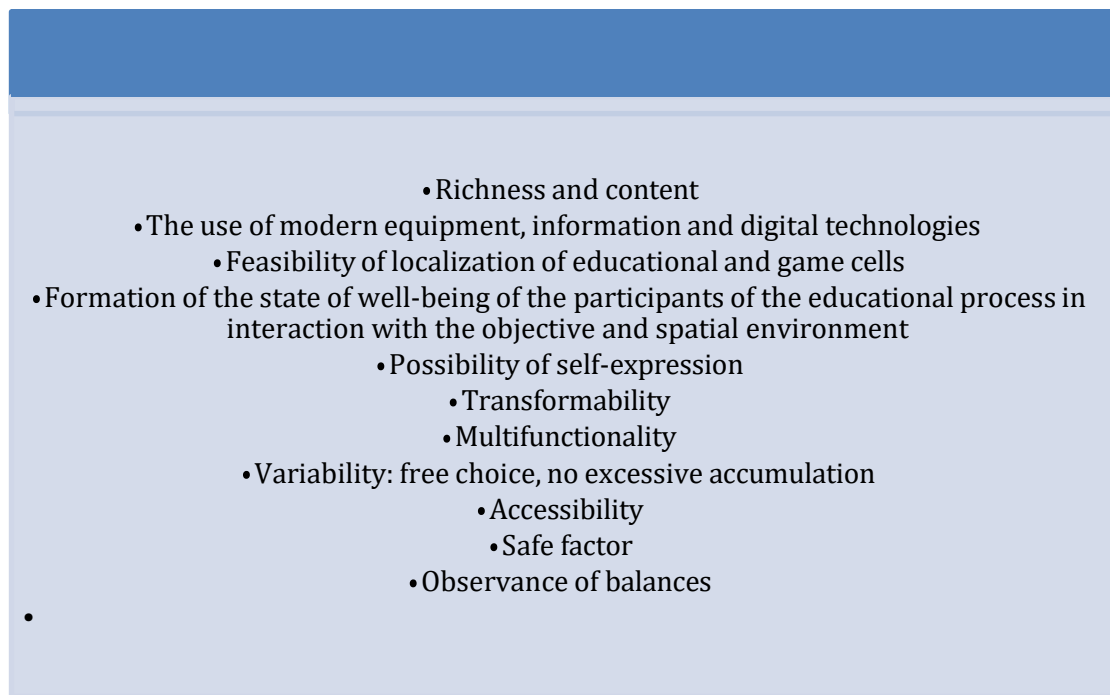
Source: authors' development.

Stage of the study of documents provides an analysis of the main legislative acts, which formulate the main aspects of the formation of educational and gaming space: programs, strategies for the development of educational institutions, plans for the year, thematic control materials, the main legislative acts on the digitalization of educational space.

However, cognitive and game space must meet the main relevant criteria, among which we highlight the content, variability, transformation, availability of modern interactive equipment, the use of digital communication technologies, emotional well-being of participants in the educational process, etc. (See Figure 3).

Figure 3

Criteria for Cognitive Play Space



Source: Authors' development.

All forms and means that contribute to the formation of children's play activity fall into several categories: material play techniques (playing fields, specially formed means to organize play, objects substitutes, etc.); information-game means (observation, literature, excursions); interactive means (speaking special computer technologies: interactive boards, interactive floors, game provocation, social design, quest games, flash-games, etc. (Lash et al., 2022).

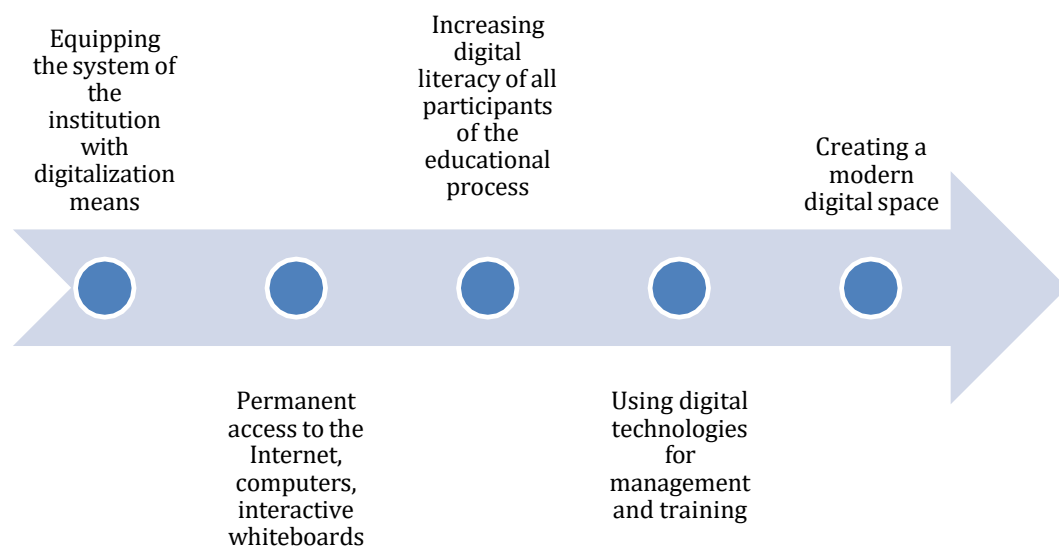
An important part of the cognitive play space is a specific set of diverse equipment (Healey et al., 2019), as well as modern devices, which are important for the formation of relevant competencies of children (in particular, digital, informational, cognitive, communicative, etc.) and contribute to their education (Tatli, 2018). Modern equipment should be placed in accordance with their functional characteristics, taking into account the type of play work. Most toys should have polyfunctionality, thus,

it will promote imagination, creativity, and creative thinking in children (Banting & Williams, 2020). At the same time, the cognitive play space should all accommodate new and novel equipment, which will promote children's critical and cognitive development. At the same time, the teacher should analyze the children's actions in detail and calculate the appropriate amount of equipment. For the space to be effective, all unnecessary things (not related to learning and cognitive work) should be removed (Anggraini & Handayani, 2022). Also, modern researchers note that the cognitive and play environment should be medium, because in a large space children get lost, lose interest in play. At the same time as a small space is not enough to realize free play (Ritter, 2022). Such factors in general will not contribute to the effective implementation of the cognitive activity of the child.

When forming a cognitive and play space using digital technology, a number of areas of implementation of digitalization in the educational process should be taken into account (See Figure 4).

Figure 4

Directions for Introducing Digitalization into the Learning and Playing Process



Source: authors' development.

Playful digital devices can be used as a weighty educational tool aimed at the formation of a critical and analytical type of thinking, socialization, and spatial imagination (Storli & Sandseter, 2019). The current educational institutions are actively introducing touchscreen interactive whiteboards, but Interwrite Dual Board in order to organize creative classes and circle interactive work with children. Installed Work Space for the use of various programs on the board is also fully supported by office relationships such as Word, Excel, and PowerPoint. This promotes children's interest in learning activities (Chukusol et al., 2022). Such relationships form different notes, promote editing of information and storage in the course of work. A characteristic feature of using Interwrite DualBoard is the formation of the organization of joint activity in the mode of two users. At the same time, touchscreen devices are interesting for children because they allow them to activate their cognitive work by touching the touch screen. Psychologists believe that working with touch screens gives such a feeling that the child gets

things done (Gashaj et al., 2021). This contributes to her development in many internal areas. In addition, a responsive touch device interests children and builds positive emotions, curiosity, etc.

However, the most common digital tool used by educators is a presentation formed in Microsoft PowerPoint (Sousa, 2021). In general, the multimedia-assisted lesson acts as a visual aid and demonstration material, which affects the emotional reinforcement of the lesson, mental development, supporting children's imagination and creativity in the educational environment. So, pre-established tasks with the use of digital technology require children to understand the content and essence of the task, the algorithm of its implementation. A characteristic feature of tasks for modern children is the formation of gradual complication of the task content through the prism of the game form (Wannapiroon et al., 2021). This is realized with the use of special drawings (symbols), while the learning program is "embedded" in the tasks (games) themselves. In addition, the mandatory components of a learning game task are the presence of challenges, actions, and reactions, creative and analytical approach. This will lead to specific relevant skills and achieve a greater level of assimilation of didactic material. Conditional game experiences can be used by children in order to implement different actions. A basic component for today's teaching programs that teachers use is the digital tool Google Drawing. To work in it, children should register through a Google account.

In order to form game and learning tasks, it is also important to use the service Jigsaw Planet, which affects the mastery of the necessary relevant skills. At the same time, creating personal authoring tasks requires registration. However, without registration actions, it is possible to apply game tasks formed by other users.

Discussion

That is why children's learning of different types of competencies takes place in accordance with their participation in certain types of activity. Play activity is the leading activity for children, but researchers also distinguish equally important motor, natural, object, pictorial, musical, theatrical, literary, sensory-cognitive, mathematical, speech, socio-cultural activities. Each of them needs children's practical understanding of the system of conventional and accessible knowledge about themselves and their environment, moral values, the ability to successfully and effectively use the information obtained during the training. Thanks to this, competent children act independently and constructively in different life and social circumstances.

An additional challenge for integrating cognitive play space into the learning process should be to teach children how to communicate competently with modern media, how to distinguish important and necessary information from a variety of messages, how to distinguish low-brow or fake content, and how to understand the use of media resources. In particular, the use of media becomes a comprehensive way of understanding the world around us, making digital tools tangible in children's educational, learning, and cultural development (Aghion et al., 2021).

Properly organized work with information sources allows to create an opportunity for children to perceive, analyze, evaluate, and create media texts. In fact, under these circumstances, working with information and media resources corresponds to the main content of educational work in children's learning. For example, as sociological surveys of parents of young children demonstrate, at least two to three out of five young children use a smartphone or tablet. Such children have abandoned the familiar and inherently childlike toy material, replaced by mobile computer entertainment (Van Vught & Glas,

2018). Therefore, one must agree with researchers who believe that such growth trends of young fans and users of mobile digital devices should be used wisely, as modern realities dictate just such ways of education and learning (Clark et al., 2020). Adequately applied digital technology, therefore, can be considered an integral element of the educational process.

At the same time, an additional important characteristic of the use of digital technology in the cognitive-game space of educational institutions is reproducibility, that is, the ability to use, repeat, reproduce, implement pedagogical technology during the educational process. Modern possibilities of digitalization can become extremely effective tools in pedagogical use, which does not depend on the age of the teacher, the characteristics of his experience, or personal characteristics.

However, we should also keep in mind the challenges posed by digitalization. Preschool and elementary school children in practice are confronted with a large number of messages coming from various sources over different intervals of time. The assimilation and reproduction of this array of information, analysis, and forming one's own opinion about a particular message is an important activity that children engage in. In particular, it is thanks to play, as a leading activity of children, that there is a rational and optimal organization of work with any informational messages.

In the formation of media literacy skills, the play takes on a special additional importance because it corresponds to the inner essence of young children. In particular, children are not able to perform the absolute majority of various actions in the same way as adults, if only because they lack certain elements of life experience. Without appropriate media literacy skills, children are capable of the deepest immersion into the game realities, which can cause the formation of some distorted picture of the world, further development of infantile behavior, inability to critically assess the situation, to think and operate with information.

Therefore, the need for proper media literacy (Zadeja & Bushati, 2022) should be taken into account when shaping the cognitive and playful space of educational institutions.

Introducing children to the world of media, learning about the histories of mass interaction and other forms of media, and teaching them how to use media are particularly important given the digitalization of education and upbringing in general.

Conclusions and Implications

Therefore, the digitalization of the cognitive-playing space of educational institutions is an urgent problem for research in terms of further prospects for its implementation. In particular, we propose a conditional model of cognitive-playing space, which will act as a comprehensive catalyst for the cognitive activity of children and will be formed of prerequisites, a comprehensive study of the state of the spatial environment, development and implementation of parameters to assess and endure the material and technical conditions and tools, direct implementation and critical reflection aimed at comprehension and overcoming potential obstacles.

At the same time, the use of modern digital technology is effective for creating a cognitive and playful space. In order to be as effective as possible, a number of areas of digitalization of learning activities should be taken into account. First of all, it is a question of purchasing digitalization tools and guaranteeing unproblematic access to the Internet, availability of other digital tools, etc. Work with

digital gadgets simultaneously requires appropriate skills and knowledge of pedagogical staff, able to unlock the potential of children, to teach them using modern technology.

It is also an important problem for children to master relevant skills and digital competence (at least its basics). Modern digital technologies contain many hidden dangers, and training to work with them is an important component of the modern educational process. We also believe that the necessary level of mastery of digital competencies is also important for parents because children are taught not only within the appropriate institutions but also at home.

Further research will also require the effectiveness of digital technologies because they are rapidly evolving, so, in all likelihood, will require further study.

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