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THE METHODOLOGICAL BASES FOR INTELLECTUAL GAMES AIMED AT THE FORMATION OF PRESCHOOLERS' META-ABILITIES*

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Abstract

This article presents a comprehensive study of the methodological foundations that have been carried out on the selection of intellectual games, especially chess, aimed at developing meta-abilities in older preschool children. This research, conducted in the context of the Republic of Armenia, addresses a significant knowledge gap regarding the development of meta-abilities of preschool children, with particular emphasis on the use of game-based learning methodologies, particularly intellectual games. Based on the work of Bethel-Fox (1992), which clearly distinguishes types of meta-abilities, the study offers a solid methodological framework aimed at optimizing the selection of intellectual games, mainly focusing on the development of personal meta-abilities such as self-orientation and initiative (Brown R. B, 2002). During the research, the gaps and features related to the field were thoroughly studied, and specific methods of their correction were developed in the context of the selection of intellectual games. At the end of the research, theoretical analyses were presented with empirical evidence collected from experimental research in two groups of 5-6-year-olds. The first group comprised 20 children, and the second group comprised 6. The first group was in Hrazdan, and the second was in Yerevan. The article examines in detail the content, implementation strategies, and resulting outcomes of using Chess as a means of building meta-skills.

Keywords: *meta-abilities, intellectual games, preschool education, methodological basis, game-based learning, chess.*

INTRODUCTION

In today's ever-changing world, a person is constantly in dynamic motion and finds himself in ever-changing situations. Fundamental, critical, and supporting abilities are essential for a person, and they include cognitive and personal aspects, helping a person to express himself, realize and set goals in different situations, show initiative, analyze, and find different solutions. Human meta-abilities are considered vital abilities, the formation of which is one of the essential and current

problems of preschool education today. The formation of meta-skills is discussed in the works of several authors, Bethel-Fox (1992) and Boyatzis (1982), but the problem is not covered so much in preschool children. Moreover, it is not considered as a problem. The methodological basis for selecting games, particularly intellectual games (Brown R. B, 2002). At the same time, the results of some research conducted in the field document that using chess in the educational system can improve children's academic abilities, especially in mathematics. A systematic review and meta-analyses by Sala (2016) document the positive effects of chess on academic achievement.

LITERATURE REVIEW

To understand the term “meta-ability”, it is necessary to study the term “ability”. Generally, "competence" combines practical and theoretical knowledge, cognitive skills, behaviours, and values necessary for effective job performance. Scholars have defined the term "ability" in different ways. Brown introduced "ability" in 1959 (Brown R. B, 2002).

Brown states that capability consists of skills that enable participation in job performance. However, it is unclear whether the same ability accompanies individuals throughout life or leads to acquiring other abilities. An analysis of the term "metacapacity" helps answer these questions. The prefix "meta" means "above," indicating that meta-skills are a foundation for other skills. Thus, meta-competence is characterized by multi-content knowledge, which is the basis for further skill development. Bethel-Fox (1992) distinguished what she called "general abilities" (Brown R. B, 2002).

In the preschool age, the use of Chess is essential in the development of meta-abilities. However, although some studies document the positive effects of chess learning on children's mathematical and academic abilities, research on the transferability of chess skills suggests some limitations to generalization (Sala et al., 2016). For example, generalization between chess and mathematics, especially in problem-solving and quantitative relationships, may simplify and clarify these findings.

"According to Vygotsky (1978), the most critical moment in a child's intellectual development occurs when speech and practical activity coincide, transforming action and enabling higher forms of intelligence to develop (p. 25). Moreover, in this context, the intellectual game of chess is ideally considered. According to Vygotsky, such interaction positively affects various psychological functions, including perception and attention (p. 31). ".

METHODS AND METHODOLOGY

In order to examine the term "metastability," it is essential first to examine and define the term "ability." In general, "ability" is assessed as a combination of practical and theoretical knowledge, cognitive skills, behaviour, and values necessary for effective functioning. The term "ability" has been defined in one way by various scholars, but the term was first introduced by Brown in 1959. According to Brown (2002), ability includes a set of skills that enable one to participate in the demands of a job. Despite the various existing definitions, there is no clear clarification as to whether an ability is a lifelong characteristic or perhaps it contributes to the development and formation of other abilities. All these discussions are clarified by examining the term "Metaability."

The prefix "meta" means "above". Therefore, Meta-Capabilities are foundational capabilities upon which other capabilities can be developed. This view is consistent with Bethel-Fox's (1992) categorization of "general abilities," which are also considered individual and personal characteristics that directly impact effective performance. These abilities are often considered meta abilities, and Bethel-Fox defines distinct types of metastability, including:

1) Cognitive and cognitive abilities
2) Influence
3) Organizational abilities
4) Personal characteristics include Initiative and Self-determination (Brown R. B, 2002).

Despite various research discussions, often unnecessary attention is paid to the methodological foundations of research (Kothari, 2004). Various intellectual games are organized in preschool educational institutions based on the content of the lessons. However, this approach cannot adequately contribute to forming essential meta-capabilities because games are often chosen on unnecessary methodological grounds. Thus, there is a need to clarify the methodological bases for selecting intellectual games that promote meta-abilities. It involves considering the purpose of the game and other factors such as the time, environment, and methods used, ensuring that the chosen games meet the methodological requirements.

Intellectual games, made according to the requirements of didactic games, clearly contribute to forming meta-abilities during game activities. Considering the above, it can be concluded that games with intellectual rules are considered practical tools for promoting preschool children's personal, cognitive, and self-management meta-abilities, which in turn emphasizes the importance

and relevance of the research.

The main goal of the research is to propose methodological approaches to selecting intellectual games that favour the development of meta-abilities in children of senior preschool age. The methodological framework, in turn, includes theoretical and practical scientific methods, which together form the basis of the research.

The methodological criteria for the selection of intellectual games include several fundamental principles.

1. The selected games should correspond to children's age and individual characteristics.
2. Games must be designed and selected on such principles to facilitate the development of specific meta-abilities.
3. Games should be dynamic, attractive, and engaging.

Thus, the methodological basis we propose for selecting intellectual games derives from the goals outlined in this study, focusing on specific meta-abilities for development. Proposed methodological approaches include:

• Ensuring the formation of basic abilities in children.

• Encouraging the development of additional skills within selected core competencies.

• Build on existing abilities to promote progressive development while considering the child's intrinsic capabilities and characteristics.

• To promote not only the mechanical application of the rules of the game but also the expression of initiative, self-regulation, and self-governance.

• Carefully select play context, timing, and team dynamics to promote the child's self-actualization, self-organization, and self-development.

In line with these methodological approaches, the intellectual game "Chess" was chosen as the focal point of this research. The selected methodological frameworks were justified through pilot validation.

In the second phase of our experiment, we implemented the methodological approaches proposed by us with the experimental group.

First, we introduced the chess board and its structure to the preschoolers. Then, we played games on the giant chessboard, which enabled the preschoolers to orient themselves on it and understand its directions. In art classes, preschoolers drew a chess board and made it with coloured paper and plasticine.

Second, preschoolers were taught chess pieces and their moves. For this purpose, we presented fairy tales about chess pieces, small poems, and riddles to preschoolers. During physical education, they walked on a giant chess board, showing the movements of chess pieces. We also organized games using a giant chess board, where, for example, preschoolers had to collect the objects (cones, cubes) that moved on the chess board as Pawns, Rockers, Bishops, Knights, Kings, and Queens.

Third, we created problem situations on a giant chess board that preschoolers had to navigate and solve. We randomly placed different chess pieces on the board and asked the preschoolers to identify each piece and name its move.

PARTICIPANTS

Twenty children aged 5-6 years participated in the research, integrated into various methodologies: Speech Development, Mathematics, Fine Arts, Physical Education, and Ecology. During the research, we emphasized the following methodological approaches:

- Developing the ability to solve problem situations.
- Providing a safe environment and fostering respect for existing rules.
- Developing the ability to orient in space and time.
- Developing the ability to think, plan actions, and show initiative.

The first experimental research lasted one year and involved twenty children from the senior group of Kindergarten No. 8 in Hrazdan City, Kotayk region.

In the preliminary stage, we identified a diagnostic methodology revealing the development level of preschoolers' meta-abilities (initiative and self-orientation), developed by A. M. Shetinina. The identification methodology includes criteria for demonstrating initiative and evaluation points:

- **23-40:** High level
- **11-22:** Medium level
- **0-10:** Low level

Using these methods, we identified the experimental group's initial level of development of self-orientation and initiative. The results are presented in Table 1, Table 2, and Chart 1, Chart 2.

RESULTS

Table 1. The Initial Level of Personal Meta-Ability / No. 8 kindergarten in Hrazdan city/

Experimental Group, n = 20		
Levels	**n**	**%**
Low	10	50
Medium	8	40
High	2	10

The study was also replicated in a preschool setting, specifically among 5—to 6-year-old children at the ‘’Chipolino’’ private preschool educational institution in Yerevan, lasting one year. This replication involved a small sample of six children, allowing for an exploratory examination of the impact of chess instruction on early cognitive development and meta-abilities. The results are presented in Table 2 and Chart 2.

Table 2. The Initial Level of Personal Meta-Ability / Yerevan, Chipolino Kindergarten/

Experimental Group, n = 6		
Levels	**n**	**%**
Low	3	50
Medium	2	33.33
High	1	16.67

DISCUSSION

In the **first study,** according to the results presented in this paper, the final phase of the experiment aimed to present the results obtained from the preliminary and formative phases for comparison. Initially, ten children (50%) showed a low level of personal meta-ability, while eight children (40%) showed an average level, and two children (10%) showed a high level. In contrast, the final results indicated that four children (20%) were at a low level, nine children (45%) were at a medium level, and seven children (35%) were at a high level of personal meta-competencies.

A total of 6 children participated in the second study, in which six children participated; according to the results of the initial stage, we had the following indicators: stage 3 showed a low

level of meta-ability, three children (50%), an average level of 2 children (33.33%), and one child (16.67%) - high level of metacognition. At the end of the study, the results changed compared to the initial one: 2 children had a low level of metacognition (33.33%), three children had an average level (50%), and one child had a high level (16.67%).

The study's results document a difference in both experimental groups' initial and final results, which speaks of work efficiency and positive impact."The results of this study support the idea that playing chess can improve children's abilities through the development of metacognitive skills.

According to the results, chess develops apparent cognitive abilities and creates a zone of proximal development that enables children to develop and expand their learning (Vygotsky, 1978).

The results are summarized in Tables 3 and 4 and Charts 3 and 4 to facilitate comparative analysis.

Table 3: Development of Personal Meta-Ability in the Experimental Group

Experimental Group				
	Initial Level, n = 20		Final Level, n = 20	
Levels	**n**	**%**	**n**	**%**
Low	10	50	4	20
Medium	8	40	9	45
High	2	10	7	35

Table 4: Development of Personal Meta-Ability in the Experimental Group

Experimental Group				
	Initial Level, n = 6		Final Level, n = 6	
Levels	**n**	**%**	**n**	**%**
Low	3	50	2	33.33
Medium	2	33.33	3	50
High	1	16.67	1	16.67

Strengths and limitations of the study

Despite the growing interest in using chess as an educational tool, the research has several distinct strengths, but it also encountered several limitations that deserve discussion. One of the

essential advantages is the innovative approach of using chess to increase children's meta-abilities; despite the importance and urgency of the issue, limited research has been conducted on the issue, and the topics related to this in the literature are minimal. Notably, the study specifically aims to examine the relationship between chess and metacognitive skills and their identification to fill gaps in the field.

The interventions were integrated into the preschool program, allowing for a practical comparison between chess learning and traditional teaching methods. This real-world application increases the findings' relevance and potential implications in educational settings.

Despite the topic's topicality and importance, limitations were also a natural part of the process. A notable obstacle was the lack of support from educational institutions and the lack of staff who could professionally engage in the process and provide a supportive approach, such as chess sessions and data collection. The lack of these resources may hinder the implementation of the study since the effectiveness of the intervention is highly dependent on the performance of skilled instructors.

Furthermore, much of the existing research on chess and this area of education assumes a narrow focus, emphasizing specific contexts or focusing specifically on groups of school-aged children. Such a narrow and specific focus may limit the applicability of the findings to a broader range of educational settings and the preschool sector.

Such a lack of research limits information on how the use of chess in an educational context as an intellectual game may influence the formation and development of meta-skills over time. Although a few studies address cognitive abilities, they do not address the formation of meta-abilities, highlighting the need for targeted research.

Given that most of the research has been conducted in a specific region and has a specific and narrow cultural and educational focus, this limitation may limit the transferability of findings to different settings.

RECOMMENDATIONS FOR FUTURE RESEARCH

The research contributes to clarifying the effect the use of chess as an intellectual game can have in the educational process in preschool education. More clearly among children of older preschool age, defined as 5-6 years old. The research discusses issues such as developing meta-abilities through intellectual games, particularly Chess. Although the findings and research results

indicate an interaction between chess and meta-ability development, this approach requires further in-depth and time-consuming study. However, it is essential to note that the role of this research is vital in the field because the investigations and analyses on the subject are very limited in nature.

There is also a significant gap in research aimed explicitly at registering an educational champion through chess. Further research is needed to examine targeted instructional strategies integrating chess into preschool education and evaluate whether or not this approach can effectively increase other types of meta-competencies.

Thus, further implementation of this study in a deeper context will help confirm the generalizability of the findings.

CONCLUSION AND FINDINGS

Based on the scientific and methodological literature studies on the fundamental question and the analysis of the results of experimental research, we have come to the following conclusions. Analyzing the terms "ability" and "meta-ability" reveals their essential difference, and meta-ability becomes the axis on which other related abilities are based.

The study of intellectual games, especially chess, reveals their possibilities, pedagogical value, purpose in activities organized with children, and, therefore, their direct influence on the formation of children's meta-abilities.

Chess provides many opportunities for preschoolers to develop their meta-abilities, initiative, self-orientation, self-expression, and self-realization, which are very important nowadays.

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