



**CONSTRUCTION OF HYPOTHESES BY YOUNGER SCHOOLCHILDREN IN THE
PROCESS OF SOLVING PROBLEMS**

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ANNOTATION

The article discusses the structure of hypotheses in the process of solving problems by elementary school students, the analysis of hypothesis testing in selected situations, as well as a complex phenomenon that provides purposeful, multifaceted and grounded research.

Keywords: construction, hypothesis, situation, thinking, subject-operational knowledge, required data.

АННОТАЦИЯ

В статье обсуждается структура гипотез в процессе решения задач школьниками младших классов, анализ проверки гипотез в выбранных ситуациях, а также комплексное явление, обеспечивающее целенаправленное, многогранное и обоснованное исследование.

Ключевые слова: построение, гипотеза, ситуация, мышления, предметно-операционные знания, искомые данные.

INTRODUCTION

Trends in the development of society at the present stage place quite high demands on a person as a possible implementer of socio-economic innovations. The problems of formation and development of qualities that allow the subject to take active actions in detecting problems, revealing their essence, predicting the unknown and ways to achieve it are significant.

The construction and testing of hypotheses in choice situations is undoubtedly a complex phenomenon that provides a purposeful (without random samples), multivariate (due to the correlation of the initial and required data) and reasoned search for what is required. The increasing relevance of this aspect of research determines the need to study the possibility of implementing a flexible and extraordinary approach to solving problems of various levels arising before the subject in various fields of activity by putting forward qualitative hypotheses.

Intellectual initiative is manifested only if the subject is not limited to one, habitual approach to resolving the current situation, but finds a rational, original, effective way to implement the requirements of the task. Only the rejection of "imitation", which manifests itself in a person's desire to copy proven solutions in the past, will allow an exhaustive analysis of the conditions of the problem under study, if necessary, change aspects of the consideration of the properties of objects and propose a new solution strategy. Actually, the development of creative potential is designed to ensure the



transition from established stereotypes, standard combinations and generally accepted solutions to the desire for a constructive transformation of reality [1].

ANALYSIS OF THE LITERATURE ON THE SUBJECT

The issues of teaching primary school students creative thinking in the process of education are reflected in the studies of Uzbek scientists N.G.Alovutdinova, A.Ya.Bobomurodova, T.U.Ziyadova, R.Ibragimov, N.A.Kosimova, U.A.Masharipova, Sh.U.Nurullayeva, A.K.Nisanbayeva, O.OKhunzhonova, A.Eshaboeva, A.R.Hamroeva, N.A.Hamedova, M.Z.Hamdama, etc. In different periods, the issues of the development of the creative imagination of students at different stages of the educational process were studied by M.Abdullayeva, B.S. Abdullayeva, R. Adizov, K.S.Zhumaniyozov, M.Kosimov, M.Kullakhmetova, Z.T.Ishanova, K.Rakhimova, M.Saidov, N.H.Sattorova, R.G.Safarova, K.A.Farfieva, Sh.S.Sharipov, Ch.T.Shokova, Sh.ZH.Yusupova, etc [2].

The study of the problem of constructing hypotheses is given a significant place in the works of domestic and foreign psychologists. The emphasis on the importance of anticipating what is sought is made in the works of A.V. Brushlinsky, J. Bruner, A.M.Matyushkin Among the fundamental studies affecting the role and place of the hypothesis in the structure of problem solving, one can name the works of L.I.Gurova, Yu.Kozeletsky, Yu.Kulyutkin, G.S. Sukhobskaya, L.A.Regush and others.

In turn, the problems of hypotheses put forward by schoolchildren in the process of solving educational tasks are not ignored. Authors such as D.V. Vilkeev, E.I.Mashbits, T.Gergey, L.M.Friedman and others have contributed to the practical and theoretical understanding of the importance of problem-based learning, the organization of the educational process for solving problems (including the construction of hypotheses) [2].

RESEARCH METHODOLOGY

The word "hypothesis" in the literature on epistemology and methodology of science is used in two main meanings. In the first case, the hypothesis is defined as "unfounded (or insufficiently substantiated) and, consequently, not completely reliable knowledge, that is, knowledge whose truth is not guaranteed" [3, p.107]. In foreign literature, the term "hypothesis" is often given such a broad meaning that it turns out to be identical to the term "knowledge". Thus, Stephens W. [210] defines a hypothesis as "any attempt to describe reality in words" [3, p.45]. With this definition, the varieties of the hypothesis are not only "premonitions", "guesses", but also any "descriptions", "facts", "positions". In the second meaning, the hypothesis is understood as a method of research, that is, a method of obtaining new knowledge. It is considered specific for such a method that the result obtained with its help (new knowledge) is a hypothetical position or a set of hypothetical positions.

ANALYSIS AND RESULTS

One of the generally accepted distinctions of tasks consists in their division into standard and non-standard, in solving which hypotheses require fundamentally different directions of mental activity from the subject. In the process of solving standard tasks, first, subject-operational knowledge is



updated. When solving such a problem, the hypothesis is put forward as an assumption about the choice of means of solution (the nature and scope of the necessary operations are clarified). In this case, the hypothesis is the link between the problem condition and the found (reproductively) solution principle. The solution to a non-standard problem, as indicated in many works, consists in opening or creating new connections, such a transformation of the properties of objects that will allow you to get what you need. In modern psychology, under non-standard tasks, it is customary to understand, first, such tasks for which a person does not have ready-made conscious means. Putting forward a hypothesis that allows you to find what you are looking for in a task of this type presupposes the independent construction by the subject of an indicative basis for upcoming actions that have not been used before. Often, the effectiveness of a hypothesis is judged by the final result of a decision. However, such a broad study of the thought process was beyond the scope of our experimental research. In this regard, the evaluation of the effectiveness of the hypothesis was determined by the possibility and expediency of its implementation. When selecting groups of responses according to the named indicator, we focused on taking into account the requirements of the task conditions, the completeness of using the information contained in the condition to build hypotheses.

From the point of view of the effectiveness of the hypotheses put forward, the answers of students can be divided into three groups: answers containing a hypothesis that does not allow to obtain the desired result; answers that have information on finding the right answer, but are not sufficient to conduct a search; answers that suggested a solution that allows you to find what you are looking for.

The insufficiently developed ability of students of the studied age groups to qualitatively analyze the data they are looking for, to choose search guidelines. Independent determination of the necessary action project (hypotheses with a high degree of effectiveness) are much more common in the reasoning of third-grade students than in first-graders. In turn, it is typical for first-graders to construct only individual operations without a full-fledged internal connection between them or copying the external form of action. The influence of the objective content of the problem on the degree of effectiveness of hypotheses put forward by third grade students is established. When solving problems in mathematics, third-graders in more cases than when presenting problems of natural science content, put forward effective hypotheses for the subsequent solution [4].

The experimental data at our disposal were analysed similarly for all the indicators used in the study. By the end of primary school, there is, in general, an increase in the validity, effectiveness, originality of hypotheses and an increase in their quantitative indicator when solving problems based on an algorithm (the exception was the lack of qualitative growth in assessing the originality of hypotheses). When solving problems by younger schoolchildren that are based on algorithmic type prescriptions, a qualitative increase in hypotheses put forward by third-graders was noted, in contrast to first grade students, according to the assessment of all indicators used in the study.

It is revealed that when presenting tasks based on an algorithm, younger schoolchildren, for the most part, formulate one idea about a potentially possible solution, face the difficulty of carrying out a full justification of the planned "steps". The hypotheses put forward differ in the typicality and stereotype of the search being conducted. It is established that the process of constructing hypotheses is influenced



by the subject content of the problem of this type. Hypotheses put forward by students when solving problems in mathematics can be evaluated much more often as reasonable and effective for finding what they are looking for, in contrast to assumptions about solving a natural science problem.

The preservation, in general, of a similar trend in solving problems by primary school students based on algorithmic prescriptions has been established. The influence of the objective side of the problem on the effectiveness of the hypotheses put forward for the subsequent solution is determined.

It is found that the hypotheses put forward by younger schoolchildren in the process of solving heuristic problems are not supported by the involvement of an original approach to the solution, by bringing several possible search directions to a greater extent than when solving problems based on an algorithm and on the basis of algorithmic prescriptions.

The dependence of the hypothetical development level on the age of the subject solving the problem is determined. Students of the third year of study find it more characteristic than first-graders to carefully develop hypotheses put forward, argumentation of reasoning, highlighting a number of assumptions about the solution method, including atypical ones. First-graders are more content with the formulation of random hypotheses, without establishing optimal connections between the data and the desired, limited to superficial explanations and obvious approaches to the solution. In general, the level of hypothetical development in the process of solving problems of varying degrees of standardization increases with age. By the third year of study, the mental activity of students in putting forward hypotheses acts to a greater extent than that of first-graders as an active search for a solution, which can be more or less detailed, reasoned, characterized by a greater or lesser number of proposed solutions, including non-stereotypical ones [5].

Turning to the study of the influence of gender on the level of hypothetical development, demonstrated the fact that there are no significant differences in the manifestation of hypothetical between boys and girls.

CONCLUSIONS AND RECOMMENDATIONS

The study of the influence of the degree of standardization of tasks on the features of the manifestation of hypothetical allowed us to establish the existence of significant correlations between individual indicators when solving standard and non-standard tasks. It is recorded that with a decrease in the degree of standardization of the task, there is an increase in the number of positive correlations between the indicators. When solving problems based on the algorithm, only two significant correlations were established in first-graders: between quantity and effectiveness, effectiveness and validity, in third-grade students, the existence of a close relationship between quantity and originality was additionally noted. In the process of solving problems based on algorithmic prescriptions, effectiveness positively correlates with validity and originality, quantity, in turn, with originality (children of both age groups) and validity (third-graders). Based on the material of the heuristic content, close relationships have been found in the teaching. There is no positive correlation of validity with any of the indicators used in the third grades between all indicators with each other; first-year students have no positive correlation of validity with any of the indicators used, the remaining significant relationships are fixed.



The results obtained in this paper on the comparison of the features of the manifestation of hypothesis in younger schoolchildren studying according to the traditional program and according to the L.V.Zankov system did not confirm the hypothesis of the study on the influence of the nature of learning on the development of hypothesis. The absence of a significant increase in the number of schoolchildren with a high level of hypothetical development among children studying under the L.V.Zankova system, in comparison with children whose training takes place within the framework of a traditional program, when solving problems of varying degrees of standardization, is recorded. The fact of the absence of a significant decrease in students with a low level of development in the process of solving standard and non-standard tasks was not noted. With regard to these didactic systems, it can be stated that the training program does not have a significant impact on the development of hypothesis.

The data obtained indicate that the spontaneous development of hypothesis, due to the age aspect of personality formation and some positive influence of certain didactic approaches in teaching, does not contribute to the formation of experience of creative search activity for solving problems of various levels.

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