

THE DEVELOPMENT OF PUPILS' CREATIVE ACTIVITY IN PRIMARY EDUCATION BY MEANS OF PROBLEM-BASED TASKS

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Abstract. The article examines the pedagogical and psychological mechanisms through which problem-based tasks develop the creative activity of pupils at the stage of primary education. The author proceeds from the thesis that creative activity is not a spontaneous manifestation of individual endowment but an integrative quality of personality formed within a specially organised structure of instruction, and that the decisive condition of its formation is the systematic placement of the child in a situation of intellectual difficulty which cannot be resolved by the reproduction of an already assimilated algorithm. Relying upon the comparative-analytical, structural-functional and systemic methods, the study reconstructs the theoretical foundations of problem-based instruction in the works of J. Dewey, L.S. Vygotsky, J. Bruner and M.I. Makhmutov, and correlates them with the contemporary psychology of divergent thinking and with the componential conception of creative motivation. Particular attention is devoted to the category of the problem situation, to the levels of problem-based instruction, and to the measure of pedagogical guidance, the violation of which converts a productive difficulty either into a routine exercise or into an experience of helplessness. The concluding propositions substantiate the didactic, motivational and organisational conditions under which problem-based tasks may be introduced into the practice of primary schooling in Uzbekistan.

Keywords: primary education, problem-based task, creative activity, problem situation, divergent thinking, zone of proximal development, heuristic method, intrinsic motivation, cognitive independence, pedagogical guidance, continuous education.

INTRODUCTION

Among the tasks that contemporary educational theory addresses to the primary school, the formation of creative activity occupies a position that is simultaneously central and insufficiently secured methodologically. The normative documents governing primary education in virtually every national system proclaim the development of an independently thinking, initiative-taking personality as the principal aim of instruction; the actual organisation of the lesson, however, continues in large measure to rest upon the transmission of ready-made knowledge and upon the reproduction of algorithms demonstrated by the teacher. The child is systematically trained to produce answers to questions that someone else has formulated, while the capacity to detect a problem, to formulate it and to seek a solution independently remains an incidental by-product of instruction rather than its deliberate object. This discrepancy between the declared aim and the prevailing means constitutes the practical problem from which the present investigation proceeds.

The resolution of this discrepancy requires, in the first instance, a terminological clarification. Creative activity should not be identified with creativity understood as a stable individual trait or as a level of giftedness. It is an integrative quality of personality comprising a motivational component, expressed in a sustained cognitive interest and a readiness to encounter the unfamiliar; a cognitive-

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operational component, comprising the intellectual procedures of analysis, transfer, combination and the generation of alternatives; and a volitional-regulative component, manifested in the capacity to persist in the face of an unresolved difficulty. Precisely because it is composed of formable elements rather than of innate endowments, creative activity constitutes a legitimate object of purposeful pedagogical influence, and its development admits of instrumental description.

The theoretical foundation of such influence was laid by J. Dewey, who demonstrated that genuine thinking does not begin with the presentation of information but with a felt difficulty, with a state of perplexity in which habitual modes of action prove inadequate to the situation. Reflective thought, in his account, unfolds as a sequence in which the difficulty is located and defined, possible solutions are suggested, their consequences are reasoned out, and the selected hypothesis is verified in action [3, p. 68–78]. The pedagogical consequence of this analysis is fundamental: the problem is not an illustration appended to knowledge already acquired, but the genetic origin of the act of thinking itself. Instruction that excludes difficulty does not merely fail to develop thinking; it renders thinking functionally unnecessary.

L.S. Vygotsky supplied the second theoretical pillar by establishing the social origin of the higher psychological functions and by introducing the concept of the zone of proximal development, that is, the distance between what the child is able to accomplish independently and what he is able to accomplish under the guidance of an adult or in collaboration with more capable peers [10, p. 84–91]. Instruction is developmental only when it is oriented towards this zone rather than towards functions already matured. A problem-based task is precisely the didactic instrument that positions the pupil within it: the task must exceed his present independent capability, yet remain attainable through mediated effort. Difficulty that falls outside the zone produces not development but the experience of failure.

Within the didactic tradition this general principle received its most detailed elaboration in the theory of problem-based instruction. M.I. Makhmutov defined the problem situation as an intellectual difficulty arising when the pupil recognises that the means at his disposal are insufficient for the attainment of a consciously accepted goal, and he distinguished successive levels of instruction according to the proportion of the search activity performed by the pupil himself — from the problem exposition conducted by the teacher, through the partially search-based or heuristic method, to independent research activity [8, p. 122–135]. J. Bruner, arguing from different premises, arrived at a convergent conclusion: knowledge acquired through the pupil's own discovery of the structure of a subject-matter is retained longer and transferred more readily than knowledge received in finished form [2, p. 17–26].

The psychological description of the outcome towards which such instruction is directed is provided by the theory of divergent thinking. J.P. Guilford distinguished productive thinking that converges upon a single correct answer from thinking that generates a plurality of admissible solutions, and he identified the parameters by which the latter may be assessed — fluency, flexibility, originality and elaboration [6, p. 213–226]. These parameters are directly relevant to primary schooling, since the standard arithmetical or grammatical exercise, admitting of exactly one correct response, exercises convergent operations almost exclusively. Empirical studies in the psychology of creativity have repeatedly registered a decline in indices of divergent thinking during the middle years of primary schooling, a decline that coincides with the consolidation of reproductive patterns of classroom work.

An equally significant condition concerns motivation. T.M. Amabile demonstrated within the componential conception of creativity that creative productivity depends not only upon domain-relevant skills and creativity-relevant processes but also upon task motivation, and that intrinsic motivation is

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systematically undermined by an environment of intensive external evaluation, competition and surveillance [1, p. 115–128]. For the primary classroom this signifies that problem-based tasks accompanied by a rigid regime of comparative marking lose a substantial part of their developmental potential, since the fear of error suppresses the very readiness to advance a non-standard hypothesis. Contemporary analyses of problem-based learning similarly indicate that its advantages are realised chiefly in the sphere of the application and transfer of knowledge rather than in the memorisation of factual material [7, p. 240–250].

In the conditions of Uzbekistan the problem acquires an additional dimension connected with the reform of the entire vertical of education. The formation of creative activity in the primary school is meaningful only as the initial link of a continuous system in which the subsequent stages sustain and develop the acquired quality rather than suppressing it [4, p. 314–316; 5, p. 10–13], and it depends directly upon the preparation of the teacher within the new models of university formation [9, p. 325–328]. The aim of the present article consists in the theoretical substantiation of the didactic mechanism by which problem-based tasks develop creative activity in primary-school pupils and in determining the conditions of its effective realisation. The novelty of the work lies in the interpretation of the measure of pedagogical guidance as the central variable upon which the developmental effect of a problem-based task depends.

METHODS AND MATERIALS

The study employs the comparative-analytical method in order to correlate the principal theoretical interpretations of problem-based instruction that have taken shape within the pragmatist, cultural-historical, cognitivist and didactic traditions. The structural-functional approach has been applied to the composition of creative activity, permitting its motivational, cognitive-operational and volitional-regulative components to be distinguished and the contribution of problem-based tasks to the formation of each of them to be established. The systemic approach has made it possible to consider the problem-based task not as an isolated methodological device but as an element of the integral structure of the lesson, connected with the organisation of assessment, with the character of classroom interaction and with the professional preparation of the teacher. The material of the investigation comprises the classical works of the theory of problem-based instruction and of the psychology of creativity, together with contemporary research into the outcomes of problem-based learning.

RESULTS AND DISCUSSION

The first result concerns the criterion by which a task may be considered problematic. This criterion is not contained in the objective content of the task and cannot be established by inspection of its formulation alone: one and the same assignment constitutes a problem for one pupil and a routine exercise for another. A task becomes problematic only where a relation of insufficiency arises between the goal accepted by the child and the means of action at his disposal. It follows that the problem situation is a subjective-objective formation, and that its construction presupposes knowledge of the actual level of the class. The widespread practice of designating as problem-based any task accompanied by the interrogative form therefore rests upon a substitution of the external attribute for the essential characteristic.

The second result concerns the measure of pedagogical guidance, which constitutes the central variable of the entire process. Between two extremes there extends a continuum along which the developmental effect is distributed unevenly. Where guidance is excessive, the teacher in effect performs the search himself and the pupil reproduces the demonstrated procedure, so that the outward form of a

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problem lesson conceals a reproductive content. Where guidance is insufficient, the difficulty exceeds the zone of proximal development and generates not productive search but anxiety, guessing and eventually learned helplessness, which is especially destructive at primary-school age. The optimum lies in the graduated transfer of the components of the search to the pupil in accordance with the succession of levels established within the theory of problem-based instruction.

The third result concerns the motivational mechanism. A problem-based task develops creative activity only in an atmosphere in which an erroneous hypothesis possesses positive didactic value. If every non-standard response is registered as a defect and converted into a comparative mark, the pupil rationally adopts the strategy of minimising risk and reproduces the expected answer, whereby fluency, flexibility and originality — the very parameters of divergent thinking — are systematically suppressed. The organisation of assessment is therefore not an external circumstance but a constitutive element of problem-based instruction: process-oriented and non-comparative forms of assessment are a necessary condition of its effectiveness, and their absence neutralises even a methodologically impeccable system of tasks.

The fourth result concerns the typology of tasks applicable in the primary classroom and the conditions of their introduction. The developmental potential is possessed above all by open-ended tasks admitting of several admissible solutions; by tasks containing redundant, insufficient or contradictory data, which compel the pupil to analyse the conditions rather than to select an operation; by tasks requiring the transfer of a familiar method into an unfamiliar context; and by small design and inventive tasks in which the result is a product created by the child himself. Their systematic introduction presupposes, however, a corresponding preparation of the teacher, since the management of an unpredictable search demands a qualification substantially higher than that required for the presentation of finished knowledge — which makes the modernisation of pedagogical education a direct condition of the reform of primary schooling [9, p. 325–328].

CONCLUSION

The analysis undertaken permits the following conclusions. First, creative activity constitutes a formable integrative quality rather than an innate endowment, and its purposeful development in the primary school is therefore a legitimate and attainable pedagogical objective. Its formation proceeds through the components of motivation, cognitive operations and volitional regulation, each of which is activated by the situation of intellectual difficulty that a problem-based task creates.

Second, the developmental function of a problem-based task is grounded in the fundamental proposition, established independently within several theoretical traditions, that thinking originates in difficulty rather than in information. Instruction that eliminates difficulty in the interests of clarity thereby eliminates the necessity of thinking, and no quantity of correctly assimilated knowledge compensates for this loss.

Third, the decisive variable of the process is the measure of pedagogical guidance. A task situated below the zone of proximal development degenerates into an exercise; a task situated above it produces helplessness. The developmental effect arises only within the interval between these boundaries, and the maintenance of this interval requires continuous diagnosis of the actual capabilities of the class and the graduated transfer of the search activity to the pupils themselves.

Fourth, the effectiveness of problem-based tasks depends upon conditions lying beyond the methodology of the individual lesson: upon an atmosphere in which an erroneous hypothesis is not punished, upon forms of assessment oriented towards the process of search, upon the continuity of the

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approach at subsequent stages of education, and upon the professional preparation of the teacher. The prospect of further research consists in the elaboration of diagnostic instruments permitting the level of creative activity of primary-school pupils to be measured in the dynamics of their instruction.

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