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RESEARCH AND CREATIVE RESEARCH METHODOLOGY OF FUTURE TEACHERS

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Abstract. This article substantiates a methodology for developing the research and creative research competencies of future teachers, grounded in an analysis of their essence, structure and conditions of development. The study proceeds from the contradiction between the demand of contemporary education for teachers capable of investigating and innovatively transforming their own practice and the predominantly compilative and reproductive character of student research in pedagogical higher education. The author delimits research competence, understood as the capacity for methodologically correct inquiry, from creative research competence, understood as the higher-order integration of that capacity with the ability to find original problems, generate non-standard hypotheses and design novel methods. A five-component structural model is substantiated, comprising motivational-value, cognitive-methodological, operational-procedural, creative and reflexive components, together with three levels of development correlated with the Four C model of creativity. Particular attention is given to the assessment paradox, according to which the evaluation of student research is institutionally necessary yet may suppress the creativity it is meant to foster. The polemic between T. Amabile and R. Eisenberger concerning the effect of reward and evaluation upon creativity is subjected to critical examination, and it is shown that the paradox is resolvable through the design of assessment rather than through its abandonment.

Keywords: research competence, creative research competence, future teachers, teacher as researcher, pedagogical creativity, reflective practice, action research, problem finding, intrinsic motivation, Four C model, assessment of creativity, methodology of development, pedagogical higher education, competence-based approach.

INTRODUCTION

The professional role of the teacher has undergone a profound transformation in recent decades. Where the teacher was once understood principally as a transmitter of established knowledge and a reproducer of prescribed methods, contemporary education increasingly requires a professional capable of diagnosing the learning needs of particular pupils, designing instruction in response to them, evaluating the effects of that instruction and revising it in the light of evidence. Each of these activities is, in its structure, an act of inquiry: it involves the recognition of a problem, the formulation of a supposition about its causes and remedies, the deliberate testing of that supposition and the drawing of justified conclusions. It follows that research competence has ceased to be an optional accomplishment reserved for those who pursue an academic career and has become a constitutive element of teaching professionalism as such.

This conception has a considerable intellectual history. L. Stenhouse, in his influential account of curriculum research and development, argued that every curriculum proposal should be treated not as a prescription to be implemented but as a hypothesis to be tested in the classroom, and that the

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teacher is accordingly the person best placed to conduct such testing. On this view each classroom constitutes a laboratory and each teacher a member of the scientific community concerned with education. D. Schön subsequently deepened this position by showing that professional knowledge in practice-oriented fields is not simply the application of theory but consists in a form of reflection-in-action, through which the practitioner reframes problems that do not fit the categories of established theory and experiments with solutions in the course of the action itself.

Research competence alone, however, does not exhaust what contemporary education requires. It is entirely possible to conduct an investigation that is methodologically impeccable yet trivial: to select a problem whose answer is already known, to formulate a hypothesis that merely restates received opinion, to apply standard instruments in a standard manner and to arrive at conclusions that add nothing to existing understanding. Such research reproduces the outward form of inquiry without its substance. What distinguishes genuinely productive research is the capacity to discern problems that others have overlooked, to generate hypotheses that depart from the expected, to devise methods adequate to novel questions and to notice the anomaly in the data that signals something not yet understood. This capacity constitutes the creative dimension of research, and it is this dimension that the notion of creative research competence is intended to capture.

The relation between research and creativity therefore requires precise conceptual articulation. Research without creativity degenerates into procedural replication, while creativity without research remains unverified intuition that cannot be distinguished from arbitrary fancy. Creative research competence is accordingly not a sum of the two capacities but their integration, in which creative generation supplies the novelty of the problem and the hypothesis, and methodological discipline supplies the means of establishing whether the novelty is justified. The developmental account of creativity proposed by J. Kaufman and R. Beghetto, which distinguishes mini-c creativity expressed in personally novel interpretations, little-c creativity manifested in everyday problem solving, Pro-c creativity attained by professionals within a domain and Big-C creativity that transforms a domain as a whole, permits the educational task to be located precisely: the preparation of future teachers must secure the transition from the personally meaningful insights of mini-c towards the professionally recognised creativity of Pro-c.

Pedagogical research, moreover, possesses a specificity that intensifies the demands upon both components. Its object is the human being in the process of development, its situations are unique and not reproducible under identical conditions, its variables are inseparable from values, and its conduct is bounded by ethical obligations towards the pupils who participate in it. The teacher-researcher, unlike the investigator in the natural sciences, is himself a part of the situation under investigation, so that his own assumptions, expectations and actions enter into the phenomena he observes. Pedagogical research competence therefore necessarily includes a reflexive component, through which the researcher monitors not only the object of inquiry but also his own influence upon it.

In the Republic of Uzbekistan the relevance of this problem has been heightened by the comprehensive reform of the system of higher education. The Concept for the Development of the Higher Education System until 2030, the new Law on Education and the transition to the credit-module system of instruction have established the integration of education, science and practice as a strategic priority and have placed particular emphasis upon the independent and research activity of students. Research work already occupies a formal place in the curricula of pedagogical higher education in the form of course papers, qualification theses and research tasks within teaching practice.

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Nevertheless, analysis of the practice of preparation indicates that such work frequently assumes a compilative character, consisting in the summarisation of published sources rather than in the investigation of a genuine problem.

The scholarly problem of the present study arises from two intersecting contradictions. The first obtains between the requirement of contemporary education for teachers capable of creatively investigating and transforming their own practice and the predominantly reproductive character of student research in pedagogical higher education. The second, internal to the process of preparation itself, may be termed the assessment paradox: the evaluation of student research is institutionally indispensable, since without it neither the quality of preparation nor the progress of the student can be established, yet a substantial body of psychological research indicates that the expectation of evaluation may suppress precisely the creativity that preparation is intended to foster. The resolution of the second contradiction is a precondition for the resolution of the first.

The aim of the article is to substantiate a methodology for developing the research and creative research competencies of future teachers on the basis of an analysis of their essence and structure. The following tasks were accordingly defined: to delimit the concepts of research competence and creative research competence and to establish the relation between them; to elaborate a structural model of these competencies; to determine the levels of their development and the criteria of assessment; and to elaborate the pedagogical conditions and principles of assessment that together constitute the methodology of their development, with particular attention to the resolution of the assessment paradox.

The scholarly novelty of the study consists in the delimitation of creative research competence as an integrative quality that presupposes research competence without being reducible to it, in the substantiation of a five-component structural model comprising motivational-value, cognitive-methodological, operational-procedural, creative and reflexive components, in the correlation of the levels of development of these competencies with the Four C model of creativity, in the demonstration that the assessment paradox is resolvable through the design of assessment rather than through its abandonment, and in the integration of these elements into a coherent methodology of development. The results obtained may be drawn upon in the design of curricula and programmes of research practice in pedagogical higher education, in the development of criteria for the assessment of student research and in the professional development of university teachers who supervise such research.

LITERATURE REVIEW

Within Uzbek pedagogical scholarship the theoretical foundation of the present study is supplied above all by the work of N.A. Muslimov and his colleagues on the foundations of pedagogical competence and creativity. The principal contribution of this work consists in the treatment of creativity not as a rare personal gift but as a professionally significant quality of the teacher that can be purposefully developed and that manifests itself in the design of instruction, in the resolution of non-standard pedagogical situations and in the capacity to depart productively from established patterns of practice. Of particular significance for the present inquiry is the inclusion of creativity within the structure of pedagogical competence itself, rather than its treatment as an optional supplement to competence, since this position supplies the direct warrant for regarding creative research competence as an integral component of the professional preparation of the future teacher.

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The second pillar of the theoretical framework is provided by the research of Sh.S. Sharipov on the continuity of professional creativity. The scholar substantiates the thesis that creativity develops not episodically but continuously across successive stages of education, and that each stage must both build upon the creative capacities formed at the preceding one and prepare the ground for the next. His emphasis upon continuity carries a direct methodological implication for the present study: the development of creative research competence cannot be confined to the final stage of preparation, when the qualification thesis is written, but must be distributed across the whole course of study through research-oriented tasks of progressively increasing complexity and independence.

The broader value and institutional dimensions of the problem are illuminated by contemporary research on education and the formation of worldview. In the work of S. Ergashbaev on the development of the spiritual worldview of young people through the system of continuous education, it is substantiated that stable orientations are formed through sustained pedagogical processes, a thesis that accords with the principle of continuity advanced by Sh.S. Sharipov and extends it to the value foundations of research activity. In a further study by the same author concerning the elevation of the spiritual and philosophical worldview of young people, the capacity for independent critical reflection is singled out as a central educational outcome, which corresponds directly to the reflexive component of the model proposed below. The study by M.M. Mirzaolimjon og‘li and E. Shohbozbek on the educational policy of New Uzbekistan and new models of universities discloses the institutional context of the integration of education and research within which future teachers are now prepared.

Within foreign scholarship the problem has been framed through several distinct traditions that have developed largely in isolation from one another. L. Stenhouse established the conception of the teacher as researcher, while D. Schön elaborated the epistemology of reflective practice. T. Amabile advanced a componential model according to which creativity arises from the conjunction of domain-relevant skills, creativity-relevant processes and intrinsic task motivation, and demonstrated experimentally that controlling forms of evaluation may undermine creative performance. R. Eisenberger and J. Cameron challenged this conclusion, arguing on meta-analytic grounds that the detrimental effects of reward are limited and avoidable and that reward contingent upon creativity may enhance it. J. Kaufman and R. Beghetto proposed the Four C model, which distinguishes developmental levels of creative achievement. Comparative examination of Uzbek and foreign scholarship reveals that the former has elaborated the place of creativity within pedagogical competence and the principle of its continuous development, while the latter has developed the epistemology of teacher research and the psychology of creativity as separate fields; the gap addressed by the present article is the absence of an integrated model that unites research and creative competence in the preparation of future teachers and addresses the tension between their development and their assessment.

RESEARCH METHODOLOGY

The methodological foundation of the present study is constituted by the systemic approach, which made it possible to treat the research and creative research competencies of future teachers not as an aggregate of separate skills but as an integral professional formation whose components stand in relations of mutual conditioning, so that the underdevelopment of any one of them constrains the functioning of the remainder; within this general framework the competence approach performed the

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leading function, since it permitted the formulation of the results of preparation in terms of demonstrable capacities to conduct and creatively transform inquiry, rather than in terms of reproduced knowledge about research methods. The activity approach was applied in designing forms of work that place the student in the position of an active subject of inquiry, on the principle that competencies are formed only within activity of the corresponding structure. The personality-oriented approach served to take account of individual differences in cognitive style, creative disposition and research motivation, and to provide for the differentiation of research tasks accordingly. The theoretical analysis of pedagogical, psychological and methodological literature was employed in reconstructing the development of the concepts of research competence and creativity and in delimiting them from adjacent notions. The comparative method was applied in juxtaposing the approaches to the preparation of teacher-researchers adopted in Uzbek and foreign traditions of pedagogical education. Structural-functional analysis yielded the distinction of the components of the model and the determination of the function of each within the whole. Pedagogical modelling was used in constructing the five-component model and the scale of levels of development. Content analysis was applied to curricula, programmes of teaching practice and a corpus of student course papers and qualification theses in order to establish the proportion of compilative and genuinely investigative work and to identify the stages of inquiry at which students experience the greatest difficulty. Questioning of students served to establish the character of their research motivation and their conceptions of research activity, while interviews with supervising teachers were used to determine prevailing practices of supervision and assessment. Diagnostic tasks of divergent type, requiring the generation of multiple research problems and hypotheses from a single pedagogical situation, were employed in order to assess the fluency, flexibility and originality of students' research thinking. The consensual assessment technique, in which the creativity of research products is evaluated independently by several competent experts, was applied in assessing the originality and justified novelty of student research work. Pedagogical observation of research-oriented classes and of the research component of teaching practice was used to establish the conditions under which students display creative initiative. Elements of the pedagogical experiment, organised in ascertaining, formative and control stages with comparable experimental and control groups, served to verify the proposed model, and methods of mathematical statistics were applied in order to establish the significance of observed differences. General scientific procedures including analysis and synthesis, induction and deduction, abstraction, generalisation and modelling were applied consistently at every stage and served to secure the logical grounding, the correspondence to empirical evidence and the internal coherence of the conclusions.

RESULTS

The study established a delimitation between the two competencies under examination and the relation that connects them: research competence was defined as the integrative capacity of the future teacher to conduct methodologically correct inquiry into pedagogical phenomena, comprising the identification of a problem, the formulation of hypotheses, the design of an investigation, the collection and analysis of evidence and the drawing of justified conclusions, whereas creative research competence was defined as the higher-order quality that integrates this capacity with the ability to find original problems, to generate non-standard hypotheses, to devise novel methods adequate to new

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questions and to notice significant anomalies in evidence; creative research competence presupposes research competence but is not reducible to it, since methodological correctness is a necessary but not a sufficient condition of productive inquiry. On this basis a five-component structural model was substantiated. The motivational-value component comprises intrinsic cognitive motivation, tolerance of uncertainty and ambiguity, readiness to accept the possibility of failure and adherence to the ethical norms of research involving pupils. The cognitive-methodological component comprises knowledge of the logic and methods of pedagogical research, of the standards of evidence and of the current state of knowledge in the field. The operational-procedural component comprises the capacities to formulate a problem, design an investigation, collect and analyse data, interpret results and present them in scholarly form. The creative component comprises problem finding, the divergent generation of alternative hypotheses, originality in the design of methods, flexibility in the reframing of questions and readiness to recognise unexpected findings. The reflexive component comprises the capacity to evaluate one's own inquiry, to make explicit its assumptions and limitations and to monitor one's own influence upon the situation investigated. Three levels of development were then distinguished and correlated with the developmental model of creativity: at the reproductive-imitative level, corresponding to mini-c creativity, the student reproduces the external form of research while its content remains compilative; at the procedural-productive level, corresponding to little-c creativity, the student conducts methodologically correct inquiry whose problem and results nevertheless remain predictable; at the creative-research level, oriented towards Pro-c creativity, the student formulates an original problem, designs an adequate method and justifies the novelty of his conclusions. Analysis of the structure of typical student research work indicated that the operational-procedural component is developed considerably more fully than the creative component, and that the weakest links are the finding of problems and the generation of hypotheses, since these stages are most frequently predetermined by the supervisor. A further result concerns the assessment paradox: it was established that its resolution depends upon three parameters of assessment design, namely what is rewarded, since criteria confined to methodological correctness systematically favour predictable research; how evaluation is communicated, since informational feedback that identifies strengths and directions of development supports creative engagement whereas controlling evaluation constrains it; and when evaluation occurs, since premature summative judgement at the stage of problem formulation suppresses exploration. Finally, the pedagogical conditions of development were identified: the provision of genuine autonomy in the choice of research problems within defined thematic frameworks; the distribution of research-oriented tasks across all disciplines of the curriculum rather than their concentration in the final thesis; the conduct of action research during teaching practice upon problems arising from the student's own classroom experience; the formation of student research communities with experienced mentoring; the legitimation of productive failure as an admissible outcome of inquiry; and the inclusion of explicit criteria of originality and justified novelty in the assessment of student research.

DISCUSSION

The results obtained require to be situated within the most consequential controversy bearing upon the development of creativity within formal education, namely the dispute between T. Amabile and R. Eisenberger concerning the effect of reward and evaluation upon creative performance. In her

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account of creativity in its social context, T. Amabile advances the intrinsic motivation principle, according to which people are most creative when they are moved primarily by interest in, enjoyment of and challenge in the task itself rather than by external pressures. The principle rests upon an extensive programme of experimental research in which the creativity of products was assessed by independent experts, and in which the expectation of evaluation, the promise of reward contingent upon mere task completion, surveillance and competition were repeatedly found to reduce the creativity of what participants produced. Amabile's componential model locates the mechanism in task motivation: where attention is directed towards external goals, the exploratory engagement from which original solutions emerge is curtailed.

R. Eisenberger and J. Cameron contest the generality of this conclusion. On the basis of a meta-analysis of the experimental literature, they argue that the detrimental effects of reward occur only under restricted and readily avoidable conditions, principally when reward is offered for mere performance of the task regardless of its quality. Where reward is made explicitly contingent upon creative performance, they contend, it increases rather than decreases creativity, since it communicates to the person which dimension of performance is valued. Eisenberger's theory of learned industriousness supplies the underlying mechanism: when effort and novelty are systematically reinforced, the reinforcement confers a secondary reward value upon the experience of effort and divergence themselves, which generalises to new tasks. On this account the practical problem is not the presence of evaluation but its misdirection towards conformity and completion.

The philosophical substance of this disagreement concerns the conception of the creative subject. For Amabile creativity is an expression of self-determined engagement that external control tends to displace; for Eisenberger it is a class of behaviour that, like other behaviour, is shaped by the contingencies that follow it. Notably, Amabile's own later formulation moved towards a partial reconciliation, distinguishing controlling extrinsic motivators, which undermine creativity, from informational and enabling motivators, which may act synergistically with intrinsic motivation. Two further positions bear upon the controversy. The Four C model of J. Kaufman and R. Beghetto implies that the effect of evaluation depends upon developmental level, since mini-c creativity requires protection from premature judgement whereas Pro-c creativity is constituted precisely by the internalisation of domain standards. The tradition of L. Stenhouse and D. Schön, for its part, suggests that research grounded in problems arising from one's own practice generates intrinsic motivation of its own, independent of external incentives.

The model advanced in the present article proposes that the assessment paradox is best understood not as a contest between these positions but as a problem of design in which each position governs a distinct parameter. Eisenberger's contingency principle governs what is rewarded: criteria confined to methodological correctness teach students that predictability is valued, while explicit criteria of originality and justified novelty communicate the opposite. Amabile's distinction between controlling and informational motivators governs how evaluation is communicated. The developmental perspective of Kaufman and Beghetto governs when and how strictly evaluation is applied, requiring protection of exploratory work at the reproductive level and progressive exposure to disciplinary standards at the higher levels. Assessment designed in accordance with all three parameters does not suppress creative research competence but becomes one of the principal instruments of its development, and the apparent paradox is thereby dissolved into a set of determinate pedagogical decisions.

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CONCLUSION

The study has shown that the research and creative research competencies of future teachers constitute a core component of contemporary teaching professionalism and cannot be treated as an optional supplement to subject and methodological preparation. Their development requires a purposeful methodology grounded in a clear understanding of their essence, structure and conditions, and the present article has sought to substantiate such a methodology.

First, research competence was delimited as the capacity for methodologically correct inquiry and creative research competence as the higher-order integration of that capacity with the abilities to find original problems, generate non-standard hypotheses and devise novel methods; the latter presupposes the former but is not reducible to it. Second, a five-component structural model was substantiated, comprising motivational-value, cognitive-methodological, operational-procedural, creative and reflexive components.

Third, three levels of development were distinguished — reproductive-imitative, procedural-productive and creative-research — and correlated with the developmental levels of the Four C model of creativity, and it was indicated that in typical student research the creative component, and particularly the finding of problems and the generation of hypotheses, lags behind the operational-procedural component. Fourth, the assessment paradox was shown to be resolvable through the design of assessment with respect to what is rewarded, how evaluation is communicated and when it is applied.

Fifth, the methodology of development was grounded in a set of pedagogical conditions: autonomy in the choice of research problems, the distribution of research tasks across the curriculum, action research during teaching practice, student research communities with mentoring, the legitimation of productive failure and explicit criteria of originality in assessment. These conclusions may be drawn upon in the design of programmes of research practice, in the development of assessment criteria and in the professional development of research supervisors. The most promising direction for subsequent inquiry may be identified as the longitudinal study of the transition of graduates from student research to the research of their own professional practice.

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