

Methodology for Developing Creative Thinking in Future Teachers Through Comparative Tasks

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Abstract: This article develops a three-tier system of criteria for objectively evaluating, under experimental conditions, the effectiveness of tasks designed on the basis of a comparative approach in developing creative skills among future teachers. The system comprises criteria for task complexity (the independent variable), performance quality, and the creative product (the dependent variables). Task complexity is assessed in terms of the number of objects compared, taxonomic level, ambiguity, and contextual transfer. Performance quality is evaluated through analytical justification, logical argumentation, reflection, independence, and effective use of resources. The creative product is assessed in terms of originality, practical applicability, elaboration, and its synthetic-integrative character. The proposed system draws on the theoretical perspectives of J. Guilford, E. Torrance, T. Amabile, S. Besemer and K. O'Quin, R. Sternberg, D. Schön, and L. Vygotsky. Presented as a rubric, it provides a basis for correlation analysis of experimental data and for identifying differences between experimental and control groups.

Keywords: Comparative approach, creative skills, future teachers, task complexity, performance quality, creative product, assessment criteria, experimental study, rubric, cognitive taxonomy.

Introduction: To objectively assess the effectiveness of tasks developed through a comparative approach in fostering creative skills among future teachers under experimental conditions, it is advisable to develop a three-tier system of criteria. This system makes it possible to examine separately, yet in relation to one another, the complexity of the task itself, the quality achieved by the student while completing it, and the creative product ultimately generated. Such a three-layered structure was designed by integrating the cognitive components of creative thinking identified by J. Guilford and E. Torrance (flexibility, originality, elaboration, and fluency) with T. Amabile's social-psychological theory of creativity (the componential theory of creativity) [1].

In determining the level of complexity of a comparative task, its cognitive load, the number of pedagogical systems being compared, and the nature of the

analytical operations required serve as the principal units of measurement. The first indicator concerns the number of objects compared and the extent of their conceptual distance from one another. Comparing two national education systems represents one level of complexity, whereas a comparative analysis of three or more systems or paradigms (for example, Eastern and Western pedagogical traditions) constitutes a higher level of complexity. The second indicator is the taxonomic level of the thinking operations required by the task. Drawing on the revised version of B. Bloom's taxonomy, operations are progressively made more complex, ranging from simple comparison and classification to synthesis and evaluation [2].

The third indicator is the degree of ambiguity in the task, meaning the absence of a single unequivocal solution and the need for the student to make independent interpretive decisions. This indicator is

closely connected with the reflective observation stage in D. Kolb's experiential learning theory [3]. The fourth indicator concerns the requirement for contextual transfer, that is, the need to apply conclusions reached through comparison to a new pedagogical situation. Each of these four indicators is assessed on a three-point scale (low, medium, and high), and their sum constitutes the overall task complexity index. This provides a scientific basis for a strategy of progressively increasing task complexity in experimental groups.

Criteria for performance quality characterize students' activity during task completion: unlike outcome-based criteria, they evaluate the process through which a result is achieved. The first indicator is analytical justification, understood as the student's ability to compare pedagogical phenomena according to systematic criteria (historical-genetic, functional, and structural) rather than on an arbitrary basis. The second indicator is the logical coherence of argumentation. Here, assessment focuses on whether conclusions are supported by evidence, whether opposing viewpoints are taken into account, and whether the claim–evidence–warrant sequence is consistent with S. Toulmin's model of argumentation [4].

The third indicator is the degree of reflection. In accordance with the notion of "reflection-in-action" developed in the works of D. Schön and J. Dewey, it refers to students' capacity to monitor their own thinking, critically evaluate it, and revise it when necessary [5]. The fourth indicator is the degree of independence, namely the extent to which the student's need for external assistance (teacher instructions or ready-made examples) decreases during task completion. This criterion is grounded in L. Vygotsky's theory of the zone of proximal development and makes it possible to observe the transition toward independent performance [6]. The fifth indicator is the effective use of time and resources, meaning the student's ability to complete the assigned task within a reasonable period, systematically and without unnecessary repetition. Together, these criteria are organized into a rubric with descriptive performance levels (low, medium, high, and excellent) for each indicator, facilitating consistency among expert raters (inter-rater reliability).

By contrast, the criteria for the creative product are

intended to assess the quality of the final outcome of task completion: an idea, project, concept, or pedagogical model produced by the student. In this regard, the Creative Product Semantic Scale developed by S. Besemer and K. O'Quin serves as a methodological foundation. Adapted to the field of comparative pedagogy, the model may be divided into four principal indicators [7]. The first is originality: the extent to which the proposed idea or solution is unconventional, unexpected, and different from those suggested by other students. This indicator is generally assessed quantitatively through a frequency analysis within the group, identifying how many students proposed a similar type of solution.

The second indicator is practical applicability (usefulness/resolution), which evaluates the potential of the proposed idea to be used in actual pedagogical practice and its capacity to address a specific educational problem. According to R. Sternberg's investment theory, a genuinely creative product must be not only new but also valuable [8]. The third indicator is elaboration, understood as the depth to which an idea has been developed, enriched with details, and presented as a coherent system. E. Torrance identified this as one of the four main components of creative thinking [9].

The fourth indicator is the synthetic-integrative character of the product. This refers not to the mechanical juxtaposition of elements borrowed from different pedagogical systems, but to their organic integration into a new coherent whole. This indicator is especially significant as a distinctive outcome of the comparative approach, because it differentiates purely reproductive comparison from genuine creative synthesis.

Together, these three groups of criteria constitute the diagnostic and assessment framework of the experimental study. Complexity criteria function as the independent variable (how tasks are designed), while performance quality and creative-product criteria are treated as dependent variables (the expected outcomes). Applying such a three-layered criteria system makes it possible to conduct correlation analysis of experimental data, including the statistical examination of relationships between increasing task complexity and indicators of the creative product. It also creates a basis for reliably identifying differences

between experimental and control groups. The following section considers the stages of the experimental study and the organizational and methodological conditions for its implementation on the basis of these criteria.

CONCLUSION

The analysis substantiates a three-tier system of criteria for experimentally investigating the effectiveness of comparative tasks in developing creative skills among future teachers. Its scientific and methodological value lies in the fact that it forms an integrated diagnostic framework capable of separately observing and measuring the relationships among task design (complexity criteria), student activity during task completion (performance-quality criteria), and the nature of the final outcome (creative-product criteria). The complexity criteria serve as the independent variable, supporting a scientifically grounded strategy of progressively increasing task difficulty during the experiment. Performance quality and creative-product criteria, as dependent variables, make it possible to register qualitative changes in students' creative potential associated with this progression.

A distinctive feature of the proposed system in relation to the comparative approach is particularly apparent in the synthetic-integrative indicator within the creative-product criteria. This indicator measures the degree to which elements drawn from various pedagogical systems and traditions are transformed into an organically new whole rather than merely assembled mechanically. It thus offers a criterion for distinguishing reproductive comparative activity from genuine creative synthesis. At the same time, the independence and reflection indicators within performance quality make it possible to trace students' gradual transition from reliance on external guidance to independent regulation of their own thinking, which is considered a reliable indicator of long-term pedagogical effectiveness.

At the next stage, the developed three-layered system of criteria provides an objective measurement basis for the practical organization of experimental research. By treating task complexity as a controlled variable in experimental and control groups, it becomes possible to compare changes in performance quality and creative-product indicators, statistically investigate

correlations among these measures, and test the proposed advantage of comparative tasks over conventional tasks in developing creativity. In this way, the criteria system serves not only a descriptive but also a diagnostic and prognostic function, reinforcing the scientific foundation of the comparative-didactic approach.

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