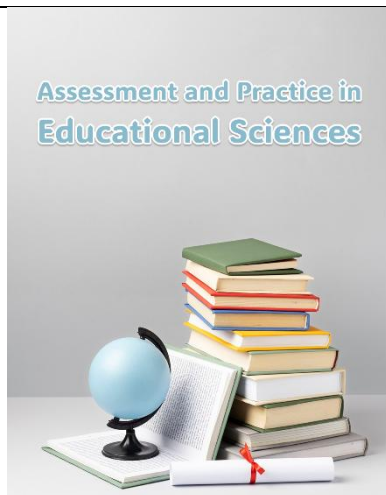




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1. **Ali. Neysi Nia**^{ID}: Department of Educational and Curriculum Planning, CT.C., Islamic Azad University, Tehran, Iran

2. **Alireza. Assareh**^{ID}*: Professor of Curriculum Planning, Shahid Rajaee University, Tehran, Iran. (Email: Alireza_assareh@sru.ac.ir)

3. **Afzal Alsadat. Hosseini**^{ID}: Professor, Department of Educational Psychology, University of Tehran, Tehran, Iran.

4. **Kambiz. Poushaneh**^{ID}: Department of Counseling and Education, CT.C., Islamic Azad University, Tehran, Iran.

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Design and Validation of a Creativity-Oriented Curriculum Model for Lower Secondary School Students

ABSTRACT

The present study aimed to develop a valid, context-specific model for a creativity-oriented curriculum at the lower secondary education level. The study employed an exploratory sequential mixed-methods design comprising qualitative and quantitative phases. In the qualitative phase, the statistical population consisted of 20 curriculum experts and university faculty members. Data were collected through purposive sampling and semi-structured interviews and were analyzed using Braun and Clarke's six-phase thematic analysis method. In the quantitative phase, the statistical population comprised 60 university faculty members and specialists in the field. The data collection instrument was a researcher-developed questionnaire constructed on the basis of the qualitative findings. Its validity was confirmed through confirmatory factor analysis, and its reliability was established using Cronbach's alpha. SPSS 23 and LISREL 8.80 were used for statistical analysis. The creativity-oriented curriculum model for lower secondary education was explained through three dimensions—content-related, process-related, and environmental—comprising 10 components and 105 indicators. The findings indicated that the content-related dimension (3.27) and the process-related dimension (3.06) were in a relatively favorable condition, whereas the environmental dimension (2.12) was evaluated as unfavorable. This finding demonstrates a significant gap between the design of creativity-oriented programs and the conditions required for their implementation in schools. Consequently, strengthening school infrastructure and cultivating an appropriate environmental culture are essential prerequisites for the practical realization of creativity development within the education system. The results further showed that fostering creativity at the lower secondary level requires a systemic reconsideration of all curriculum elements. The proposed model, consisting of content-related, process-related, and environmental dimensions, provides a practical framework for directing objectives, content, teaching–learning methods, assessment, and improvements in the school environment toward the cultivation of creative thinking. Nevertheless, the findings emphasize that the effective realization of this model requires special and prioritized attention to strengthening environmental factors in schools. Implementation of this model may provide the conditions necessary to enhance creativity and innovation among lower secondary school students.

Keywords: curriculum, creativity-oriented curriculum, thematic analysis, lower secondary education.

Introduction

Creativity has increasingly become a central educational priority because contemporary societies require individuals who can generate original ideas, approach unfamiliar situations flexibly, solve complex problems, and transform knowledge into practical innovations. Rapid technological development, the expansion of digital environments, the growing complexity of

social and organizational problems, and the changing nature of work have made the reproduction of predetermined knowledge insufficient as the primary objective of schooling. Education systems are therefore expected to cultivate learners who are not merely recipients of information but active producers of meaning, knowledge, and solutions. In this context, creativity is no longer regarded as an exceptional talent possessed by a limited number of individuals; rather, it is understood as a developable capacity that can be fostered through appropriate educational experiences, supportive environments, and purposeful curriculum design. International educational frameworks have similarly emphasized the importance of creativity, critical thinking, collaboration, problem-solving, and adaptability as essential competencies for future-oriented education (1). Accordingly, the integration of creativity into formal curricula has become a strategic requirement for improving the relevance, responsiveness, and transformative potential of education.

From a curriculum perspective, creativity cannot be developed through isolated activities or occasional enrichment programs. It must be embedded systematically within the philosophical foundations, objectives, content, teaching methods, learning activities, assessment practices, resources, grouping arrangements, temporal and spatial organization, and cultural environment of schooling. Curriculum is a multidimensional system in which decisions concerning one element influence the functioning of other elements. Therefore, a creativity-oriented curriculum requires internal coherence among its components and alignment between intended, implemented, and attained learning outcomes. Curriculum theorists have emphasized that educational programs should be understood not simply as lists of content but as interconnected frameworks encompassing goals, learning experiences, teaching arrangements, assessment procedures, and contextual conditions (2). From this perspective, developing a creativity-oriented curriculum necessitates a comprehensive model capable of explaining both what should be taught and how the conditions for creative learning should be established.

The importance of such a systemic approach is reinforced by Eisner's view that schools should provide rich, flexible, and intellectually stimulating experiences rather than restrict learning to uniform and narrowly measurable outcomes. Educational environments that value multiple forms of understanding, interpretation, and expression are more likely to support imagination and originality (3). In contrast, overly standardized curricula, rigid teaching procedures, excessive emphasis on correct answers, and assessment systems focused primarily on reproduction may suppress learners' willingness to experiment and take intellectual risks. Amabile similarly argued that creativity can be undermined when individuals experience excessive control, fear of evaluation, restrictive rules, or insufficient autonomy (4). These insights suggest that curriculum reform for creativity must address not only instructional content but also the psychological and organizational climate in which learning occurs.

Creativity in education is shaped by the interaction of individual characteristics and contextual conditions. Learners may possess curiosity, imagination, intrinsic motivation, and divergent-thinking potential, yet these capacities may remain underdeveloped when classroom environments discourage questioning, tolerate only predetermined solutions, or attach excessive importance to error avoidance. Classroom contexts that support creativity generally provide autonomy, meaningful challenge, opportunities for exploration, constructive feedback, and recognition of multiple solution paths (5). Teachers play a decisive role in creating such conditions because their beliefs, instructional decisions, expectations, and responses to students' ideas directly influence whether creative expression is encouraged or inhibited. Consequently, a creativity-oriented curriculum must conceptualize the teacher not merely as a transmitter of content but as a designer of learning experiences, facilitator of inquiry, supporter of experimentation, and mediator of collaborative problem-solving.

The learning environment constitutes another major foundation of creativity development. A systematic review of creative learning environments demonstrated that creativity is strengthened through flexible use of space and time, availability of appropriate resources, collaborative relationships, learner autonomy, relevance of activities, and a school culture that values innovation (6). Such environments enable students to interact with ideas, materials, peers, teachers, and real-world problems

in varied ways. They also normalize uncertainty, encourage questioning, and treat mistakes as opportunities for revision and learning. In lower secondary education, these environmental features are especially important because students are entering a developmental period characterized by expanding cognitive abilities, greater sensitivity to peer and teacher evaluation, and an increasing need for autonomy and identity formation. A curriculum that fails to account for these developmental characteristics may inadvertently weaken curiosity and creative self-confidence.

Lower secondary education occupies a critical position in the educational continuum. At this level, students encounter more specialized subject matter, more formal assessment practices, and greater academic expectations than in primary education. Simultaneously, they develop more advanced capacities for abstract reasoning, hypothetical thinking, metacognition, and multidimensional problem-solving. These characteristics create substantial opportunities for cultivating creativity, provided that learning experiences are appropriately designed. However, the transition to subject-centered instruction may also lead to fragmented learning, increased dependence on textbooks, teacher-centered pedagogies, and examination-oriented practices. Therefore, designing a creativity-oriented curriculum for lower secondary students requires balancing disciplinary knowledge with opportunities for inquiry, integration, experimentation, and original production.

Existing scholarship indicates that creative learning should be integrated across subject areas rather than confined to the arts. Science and mathematics, for example, can foster creativity when students are encouraged to formulate questions, design investigations, generate alternative hypotheses, construct models, and explore multiple solution strategies. Teachers have identified both opportunities and challenges in incorporating creativity into science and mathematics teaching, including the need for flexible instructional time, suitable tasks, professional competence, and supportive assessment practices (7). Similarly, the relationship between scientific learning and creativity has been emphasized through approaches that combine observation, exploration, imagination, and open-ended inquiry (8). These studies demonstrate that subject knowledge and creativity should not be treated as competing aims; rather, deep disciplinary understanding can provide the conceptual resources necessary for creative thinking.

Problem-based, project-based, inquiry-oriented, and interdisciplinary teaching methods are particularly compatible with creativity-oriented curricula because they engage students in producing, testing, revising, and communicating ideas. Integrated STEM project-based learning, for instance, has been shown to support critical thinking by involving learners in authentic tasks that require the application of knowledge across disciplinary boundaries (9). Project-based curricula also provide opportunities for student choice, collaboration, sustained inquiry, product development, and real-world application. A qualitative examination of project-based curriculum elements highlighted the importance of coherent objectives, meaningful content, active learning processes, supportive teacher roles, appropriate resources, and performance-oriented assessment (10). These features closely correspond to the broader requirements of creativity-oriented curriculum design.

Assessment is another essential component because it communicates what kinds of learning are valued. Conventional assessment systems dominated by closed-ended questions and single correct responses may encourage memorization while limiting divergent thinking. Creativity-oriented assessment should instead incorporate open-ended tasks, projects, portfolios, self-assessment, peer assessment, performance-based evaluation, and feedback that supports revision. New approaches to assessing real-world creativity and mathematical problem-solving emphasize the need to evaluate reasoning processes, originality, flexibility, and the practical usefulness of solutions rather than focusing exclusively on final answers (11). Assessment should therefore function as an integral part of learning and provide students with information that helps them refine ideas, evaluate alternatives, and become more reflective learners.

Digital technologies also offer new possibilities for creativity-oriented curriculum development. Interactive software, collaborative platforms, virtual environments, and artificial intelligence can expand access to information, facilitate idea

sharing, support simulation and experimentation, and enable learners to create multimodal products. Earlier research on educational software demonstrated that technology-supported learning can contribute to creativity and academic achievement when tools are aligned with instructional objectives and actively integrated into learning processes (12). More recent discussions of smart service systems have highlighted the importance of understanding technological affordances and the ways different actors actualize them in practice (13). Applied to education, this perspective suggests that technological resources do not automatically generate creative learning; their effectiveness depends on how teachers, students, administrators, and curriculum designers interpret and use them.

The growing prominence of smart education has further increased the need to acknowledge individual differences in curriculum design. Students differ in prior knowledge, interests, learning preferences, motivation, cultural backgrounds, and creative strengths. A uniform curriculum may therefore fail to provide equitable opportunities for creative participation. Attention to individual differences, combined with flexible and creativity-oriented curriculum structures, can contribute to the transformation of educational approaches in the smart era (14). Flexible curricula allow variation in learning pathways, resources, task complexity, products, and modes of participation. Recent scholarship has accordingly emphasized the design of flexible curricula based on creative learning principles as a requirement of twenty-first-century education (15). Flexibility, however, should not imply the absence of structure; rather, it requires a carefully designed framework that preserves educational coherence while allowing adaptation to learners and contexts.

Teacher competence remains one of the most important determinants of successful implementation. Even a well-designed curriculum may have limited impact when teachers lack the knowledge, confidence, resources, or institutional support necessary to implement it. Teachers must understand the nature of creativity, recognize creative potential in diverse learners, design open-ended tasks, facilitate collaborative inquiry, use flexible assessment, and respond constructively to unconventional ideas. Research on creativity-oriented curriculum design has explicitly emphasized the teacher's role in effective implementation (16). Active teaching methods are also associated with the development of students' creative thinking and scientific reasoning because they shift the focus from passive reception to participation, exploration, discussion, and problem-solving (17). Accordingly, teacher education and continuous professional development must form an integral part of any model intended to promote creativity at the school level.

Teachers' practices are influenced not only by formal curriculum requirements but also by the hidden curriculum and the moral and relational climate of schools. Students learn implicit messages about authority, conformity, competition, cooperation, risk-taking, and the value of their ideas through daily classroom interactions. Teachers' lived experiences indicate that the hidden curriculum and school climate can significantly shape opportunities for developing creative and critical thinking (18). A school may formally endorse creativity while simultaneously discouraging it through rigid routines, punitive responses to mistakes, hierarchical relationships, or excessive emphasis on examination results. Therefore, the environmental dimension of a creativity-oriented curriculum must include organizational culture, leadership support, interpersonal trust, psychological safety, and institutional recognition of innovation.

National research has increasingly addressed various dimensions of creativity-oriented curriculum design. A creative education model developed for elementary school students emphasized the need to coordinate goals, content, teaching methods, learner activities, assessment, and contextual supports (19). Research focused on secondary education likewise proposed a creative learning model within the structure of the secondary school curriculum, indicating that creativity must be incorporated into both curricular elements and implementation processes (20). A research synthesis concerning creativity-oriented curricula for student teachers identified multiple elements that collectively influence the development of creativity, including curriculum

rationale, objectives, content, learning activities, teaching strategies, resources, grouping, time, space, and assessment (21). These findings support the need for comprehensive models rather than interventions targeting only one instructional variable.

Subject-specific studies have also contributed valuable insights. A curriculum model based on creative thinking for sixth-grade mathematics highlighted the importance of content organization, problem-solving, exploratory activities, and teaching strategies that permit multiple approaches (22). Such findings are consistent with the broader argument that creativity should be developed through domain-relevant knowledge and practices. Creativity is not merely a general capacity detached from content; students require sufficient conceptual understanding to identify problems, generate informed possibilities, and judge the appropriateness of solutions. Therefore, creativity-oriented curriculum design must combine foundational knowledge with opportunities for transformation, application, and innovation.

Curriculum content is particularly influential because it determines the knowledge, experiences, values, and problems made available to learners. Content that is overly dense, decontextualized, repetitive, or disconnected from students' lives may limit engagement and curiosity. In contrast, rich and flexible content can stimulate questioning, connect disciplines, and support the exploration of real-world issues. Comparative analyses of curriculum models have emphasized the importance of alignment among content, learner needs, developmental characteristics, educational objectives, and instructional conditions (23). A creativity-oriented curriculum should therefore include challenging but accessible content, multiple representations, authentic problems, culturally relevant examples, and opportunities for students to extend or reconstruct what they learn.

The explicit curriculum must also be examined in relation to what is omitted. The concept of the null curriculum draws attention to knowledge, skills, values, and forms of thinking that students do not encounter because they are excluded from formal educational priorities. Reflection on the null curriculum in elementary education suggests that the absence of opportunities for imagination, inquiry, interdisciplinary learning, and alternative forms of expression can itself shape students' educational development (24). From this standpoint, designing a creativity-oriented curriculum involves not only adding creative activities but also critically identifying what conventional curricula neglect. Such analysis is necessary to prevent creativity from becoming a superficial label attached to otherwise unchanged educational structures.

The literature also underscores the importance of curiosity, intellectual enjoyment, and meaningful challenge. Creativity-oriented classrooms should invite students to wonder, investigate, connect ideas, and experience satisfaction in discovery. Starko described creative classrooms as environments in which curiosity is actively cultivated and learners are supported in generating and evaluating possibilities (25). This orientation requires teachers to use questioning techniques, divergent tasks, collaborative dialogue, imagination, and reflective evaluation. It also requires educational leaders to provide sufficient time, space, materials, and professional autonomy for teachers to implement such practices.

Despite the expanding literature, several challenges remain. Many studies focus on individual components such as teaching methods, technology, assessment, or teacher roles without integrating them into a unified framework. Other models have been developed for primary education, student teachers, or particular subjects and may not fully address the developmental and institutional conditions of lower secondary schools. Moreover, formal curriculum design often receives greater attention than the environmental conditions needed for implementation. This distinction is crucial because creativity-oriented objectives and content may have limited practical influence when schools lack suitable resources, flexible scheduling, collaborative cultures, trained teachers, or supportive leadership. The gap between curriculum design and school implementation therefore remains a significant theoretical and practical problem.

A valid model for lower secondary education must consequently encompass at least three interrelated domains. The content-related domain should clarify the rationale, objectives, content, and organization of the curriculum. The process-related domain should specify learning activities, teacher roles, assessment practices, resources, equipment, and grouping arrangements. The

environmental domain should address learning time and space as well as the prevailing school culture. These domains should not be viewed as independent categories; rather, they operate as a system in which content-related decisions shape processes, processes interact with environmental conditions, and environmental factors influence the feasibility and quality of implementation. Identifying the relationships among these dimensions can provide curriculum planners, school administrators, and teachers with a more operational framework for fostering creativity.

Accordingly, the aim of the present study was to design and validate a context-specific creativity-oriented curriculum model for lower secondary school students by identifying its content-related, process-related, and environmental dimensions, components, and indicators.

Methods and Materials

In terms of methodology, the present study employed a mixed-methods design combining qualitative and quantitative approaches. In terms of purpose, it was exploratory, and in terms of application, it was applied research. A thematic analysis approach was used to develop a creativity-oriented curriculum model for lower secondary school students. Data were collected through a review of relevant sources, including books, articles, national policy documents, and other pertinent materials, as well as through in-depth, semi-structured interviews. The statistical population of the qualitative phase, which was used to extract the model dimensions, consisted of 20 curriculum experts, university faculty members, and specialists who were selected purposively. On the basis of a comprehensive interview protocol, multiple questions were posed, and a total of 15 interviews were conducted. The essential criterion governing the continuation of the interviews was the attainment of theoretical saturation; that is, the interviews continued until the value chain was complete and no new information was provided by the interviewees. To ensure data comprehensiveness, efforts were also made to establish an appropriate demographic and disciplinary composition among the participants.

Table 1. Demographic Characteristics of the Interviewees

Demographic characteristic	Category	Frequency	Percentage
Gender	Male	36	60%
	Female	24	40%
Educational attainment	Bachelor's degree	21	36%
	Master's degree	30	49%
	Doctoral degree	9	15%
Age group	20–30 years	6	9.4%
	31–40 years	19	31.5%
	40–50 years	26	44.5%
	Older than 50 years	9	14.8%

To establish the validity and reliability of the data, researcher self-review was used to enhance the credibility of the findings. Because expert and faculty-member opinions were continuously incorporated throughout all stages of the study, the expected level of reliability was adequately ensured. Furthermore, the identification and extraction of recurring data during the thematic analysis process contributed to the reliability of the research. The statistical population in the quantitative phase consisted of faculty members at the University of Tehran and national curriculum experts, whose number was estimated at approximately 60. Cronbach's alpha and composite reliability were used to assess the reliability of the quantitative phase. For this purpose, 30 preliminary questionnaires were distributed. As shown in Table 2, the obtained alpha coefficients were greater than .70, indicating a high level of reliability for the measurement instrument. Confirmatory factor analysis was also used to evaluate validity.

Table 2. Cronbach's Alpha Coefficients for the Research Variables

Dimension	Number of items	Cronbach's alpha	Composite reliability
Content-related	28	.873291	.987502
Process-related	62	.878211	.953525
Environmental	13	.865732	.968453

Findings and Results

The six-phase inductive thematic analysis method developed by Braun and Clarke (2006) was used in this study. The phases were as follows: (1) familiarization with the collected data; (2) generation of initial, first-level codes; (3) searching for themes; (4) reviewing themes; (5) defining and naming themes; and (6) producing the report.

Research Question 1: What is the structure of a creativity-oriented curriculum model for lower secondary education?

Phase 1: Familiarization with the Collected Data

The first step in thematic analysis involves the researcher's familiarization with the collected data. At this phase, the qualitative data were repeatedly reviewed to identify meanings and patterns.

Phase 2: Generation of Initial Codes—First-Level Coding

Following familiarization with the data, initial coding was undertaken. In this process, noteworthy features of the data were systematically coded across the entire dataset. On the basis of the data obtained from the review of various texts and the analysis of expert interviews, the necessary statements were extracted. Examples are presented in the following table.

Table 3. Examples of Data Obtained from the Review of Various Texts and the Analysis of Expert Interviews

No.	Meaning units—key statements from the texts	Open codes
1	One of the objectives of a developmental and creativity-oriented curriculum is to promote children's mental and cognitive development (Piri & Adib, 2009). According to Hedäl's theory, one of the dimensions of creativity in the curriculum is the provision of opportunities for inquiry and criticism (Momeni, 2012). A creative curriculum has diverse and multiple objectives (Jahani, 2008). Learning activities should be based on blended methods, workshops, inquiry, and collaborative learning (Rahbar et al., 2022; Keely & Cutting, 2014).	Development of mental and cognitive abilities Provision of opportunities for criticism and inquiry Diverse and multiple objectives Learning based on blended, workshop-based, and inquiry-oriented methods
2	If textbook content contains new, concrete, appropriate information that corresponds to learners' mental and intellectual age, it positively contributes to the development of their creativity (Vakili & Amini, 2009). Curriculum content is directly associated with students' psychological disposition (Maleki, 2008). Alignment of content with appropriate instructional materials (Ahmadi Gharacheh, 2015).	Concreteness of instructional content Alignment of content with learners' cognitive structures Alignment of content with instructional materials

Table 4. Examples of Statements Related to the Model Identified in the Review of National Policy Documents

Policy document	Location	Description	Open code
Fundamental Transformation Document of Education	Chapter 5, Macro Objectives, Objective 1	Educating faithful, creative, and entrepreneurial individuals	Institutionalizing creativity among members of society
Fundamental Transformation Document of Education	Chapter 6, Macro Strategies, Strategy 6	Expanding and deepening a culture of research, creativity, and innovation within the formal and public education system	Establishing a research-oriented culture Establishing a creativity-oriented culture

In a creativity-oriented curriculum, creativity must be considered across all curriculum elements because the selection and organization of these elements determine the orientation and overall approach of the curriculum. Accordingly, the interview questions were designed on the basis of Klein's curriculum elements, including rationale, objectives, content, learning activities, learning resources, grouping, time, space, teaching methods, and assessment.

Table 5. Examples of Statements Related to the Model Identified through the Interviews

No.	Interview question	Themes
1	What are the characteristics of a creativity-oriented curriculum from the perspective of the “rationale and justification” element?	Making learners creativity-oriented; increasing motivation and commitment to the creativity-oriented curriculum; increasing access to effective education; realizing creativity and learning for all; improving the quality of learning by facilitating access to creative educational resources and services; increasing literacy rates accompanied by creativity; increasing learning efficiency; emphasizing creative learning; contextualizing the creativity-oriented curriculum; incorporating creativity into the curriculum; and acquiring creativity skills
2	What are the characteristics of a creativity-oriented curriculum from the perspective of the “goals and objectives” element?	Building a creative society; increasing creativity-based meaningful learning; expanding literacy and addressing societal needs; facilitating access to creativity-generating resources; making members of society creative; emphasizing creativity-oriented instructional strategies for developing learners’ skills; formulating educational objectives containing creative messages; developing the ability to solve problems through creativity; ensuring the clarity and explicitness of objectives; ensuring the attainability of objectives; and prioritizing the quality rather than the quantity of objectives

Phase 3: Searching for Themes

At this phase, the extracted codes were classified into potential themes, and the coded data were organized under each theme. Accordingly, the 170 identified themes were incorporated into a questionnaire using a five-point Likert scale and presented to the experts for final confirmation. Using a mean score greater than 3.00 as the acceptance criterion, 105 themes were ultimately confirmed and 65 themes were eliminated. Examples of the confirmed themes are presented in the following table.

Table 6. Search for Initial Themes

Questions	Indicators and indicator weights	Number of themes	Status
What are the characteristics of a creativity-oriented curriculum from the perspective of the “rationale and justification” element?	Making learners creativity-oriented (5); increasing motivation and commitment to the creativity-oriented curriculum (3); increasing access to effective education (3); realizing creativity and learning for all (3); improving learning quality by facilitating access to creative educational resources and services (4); increasing literacy rates accompanied by creativity (3); increasing learning efficiency (4); emphasizing creative learning (3); contextualizing the creativity-oriented curriculum (5); incorporating creativity into the curriculum (5); acquiring creativity skills (3); establishing a creativity-oriented educational system (5); providing material and moral support to creative and innovative students (3); providing material and moral support for successful initiatives and indigenous innovations (3); creating successful initiatives through indigenous innovations (3); educating a creative and innovative generation and realizing the vision of the formal and public education system by 2025 (4); and redefining educational components to develop competencies and creative thinking (4)	17	8 confirmed 9 eliminated
What are the characteristics of a creativity-oriented curriculum from the perspective of the “goals and objectives” element?	Building a creative society (5); increasing creativity-based meaningful learning (4); expanding literacy and addressing societal needs (3); facilitating access to creativity-generating resources (4); making members of society creative (3), merged with Indicator 1; emphasizing creativity-oriented instructional strategies for developing learners’ skills (5); educational objectives containing creative messages (3); ability to solve problems through creativity (5); clarity, explicitness, attainability, and quality of objectives (4), with three indicators merged; and diverse and multiple objectives (3)	12	6 confirmed 6 eliminated

Phase 4: Reviewing the Themes

At this phase, the extracted themes were reviewed and refined in terms of internal coherence, their relationships with the initial codes, and their consistency with the entire dataset. The overall structure of the findings was then developed by integrating subthemes into higher-order categories. Accordingly, the 105 themes confirmed in the previous phase were classified into 10 components and subsequently confirmed on the basis of expert judgment.

Table 7. Classification of Themes and Formation of the Model Components and Indicators

Component	Indicators	Component	Indicators
Rationale and justification	Making learners creativity-oriented; improving learning quality by facilitating access to creative educational resources and services; increasing learning efficiency; contextualizing the creativity-oriented curriculum; incorporating creativity into the curriculum; establishing a creativity-oriented educational system; educating a creative and innovative generation and realizing the vision of the formal and public education system by 2025; redefining educational components to develop competencies and creative thinking	Assessment	Using qualitative, process-oriented assessments and divergent questions; conventional creativity-based multiple-choice tests; challenging tests; evaluating curriculum projects; using modern assessment strategies, including participation, portfolios, self-assessment, peer assessment, and consultation; rapid evaluation of learning and provision of feedback; recording and evaluating learner performance; using diagnostic, formative, and summative assessment methods; self-assessment; aligning assessment with learner activities; assessing creativity-building skills; aligning assessment instruments and assignments with learning objectives; continuously monitoring the assessment process; providing feedback to learners; using metacognitive, process-based, and performance-based assessment; and using encouragement and praise in assessment
Goals and objectives	Building a creative society; increasing creativity-based meaningful learning; facilitating access to creativity-generating resources; emphasizing creativity-oriented instructional strategies for developing learners' skills; developing the ability to solve problems through creativity; and ensuring the clarity, explicitness, attainability, and quality of objectives	Resources and equipment	Access to new forms of knowledge and skills, including information and communication technology; interaction in virtual environments and with artificial intelligence; emphasizing the use of specialized human resources in creativity education; access to all learning materials; participation in workshops, conferences, and scientific events related to creativity; access to science, technology, and innovation parks; and provision of appropriate, diverse, attractive, and flexible instructional materials and resources
Content and organization	Developing rich instructional content that facilitates creativity among learners; ensuring flexibility in content development; integrating different forms of creativity-related content; providing creative learning opportunities; considering learner conditions when organizing instructional content; observing instructional principles when developing creative content; ensuring the active participation of education specialists in curriculum development; developing creative thinking abilities, including mental and cognitive abilities; developing challenging content; developing comprehensive yet simple content incorporating problem-solving skills; providing opportunities for criticism and inquiry; developing diverse content that stimulates creativity; developing innovative and creative content to maximize learning opportunities; and designing attractive programs that encourage continued school attendance and foster creativity	Grouping	Enabling the formation of creativity-oriented groups for information exchange; establishing homogeneous and heterogeneous groups to enhance creativity; using collective and individual grouping; establishing communities of inquiry; using network-based and team-based work; implementing collaborative learning; facilitating learner development through group presentations and problem-solving methods; and developing group-based and creative learning
Learning activities	Using methods that strengthen thinking and problem-solving processes, including brainstorming and creativity-based teaching; applying modern methods related to creativity-oriented learning; emphasizing participation in creative learning; emphasizing group interaction in creative learning; helping to establish creativity-oriented educational environments and experiences; implementing flexible learning activities based on negotiation and discussion; teaching inquiry and problem-solving; emphasizing group discussion; emphasizing experiential learning and practical assignments; using problem-based learning activities; implementing blended, workshop-based, and inquiry-oriented learning methods; designing educational activities with open-ended and problem-based structures; strengthening inquiry and creativity; facilitating learners' creative interaction with diverse learning environments; implementing learning activities based on problem-solving processes; developing imagination and creativity; strengthening learning-related activities	Learning space and time	Creating a creative and innovative environment; enabling learning at any time and place by eliminating temporal and spatial constraints; creating quiet environments that facilitate concentration; optimizing the use of time and space in the instructional process through time and space management; establishing laboratories and workshops related to creativity education; organizing field trips and scientific visits; arranging classrooms in a roundtable format to facilitate discussion and the expression of opinions; allocating time in accordance with curriculum content; and eliminating time pressure

	such as problem-solving, visual thinking, and creative thinking; and developing complex and process-related thinking skills to enhance creativity		
Teacher's role	Creating creative teaching and learning experiences; ensuring novelty, freshness, and distinctive attractiveness in the presentation of materials; enhancing the ability to teach creatively; facilitating the teaching process through interaction; engaging learners in educational discussions; preparing appropriate creative lesson plans to increase motivation; presenting content through challenging group discussions; using exploratory teaching methods; using instructional aids and materials; ensuring a participatory teaching process; presenting subject matter in the form of problems and puzzles; ensuring teachers' commitment to creativity objectives; supporting learners' creative ideas; using creative teaching techniques; using indirect thinking and expression in the design of instructional materials; positioning the teacher as a creativity facilitator; and employing creativity-trained teachers	Culture	Establishing a creativity-oriented culture; institutionalizing creativity among members of society; fostering a spirit of creativity in the environment and society; creating a culture of creativity education at the lower secondary level and recognizing its necessity for learners' social lives; and providing an appropriate foundation for creativity in schools and society

Phase 5: Defining and Naming the Themes

At this phase, after a relatively stable thematic structure had been established, the researcher defined, reviewed, and named the principal themes that emerged from the integration of the subthemes. For this purpose, the content of each theme was analyzed to precisely determine the nature and dimensions of the data it encompassed. Finally, on the basis of the content of the themes and their repeated review, the final dimensions of the model were identified and named.

The dimensions of the creativity-oriented curriculum model were conceptualized at three levels: content-related factors, process-related factors, and environmental factors.

Table 8. Classification of Components and Formation of the Key Levels—Dimensions—of the Model Based on Thematic Analysis

Model dimension	Model components
Content-related factors	Rationale and justification
	Goals and objectives
	Content and organization
Process-related factors	Learning activities
	Teacher's role
	Assessment
	Resources and equipment
	Grouping
Environmental factors	Learning time and place—space
	Prevailing culture

Phase 6: Producing the Report—Presentation of the Model

At this phase, the final research report was prepared by synthesizing the abstract findings with the relevant literature and the research questions. The outcome of this process was the “creativity-oriented curriculum model,” presented in Figure 1. The model was formulated across three content-related, process-related, and environmental levels and comprised 10 components and 105 indicators.

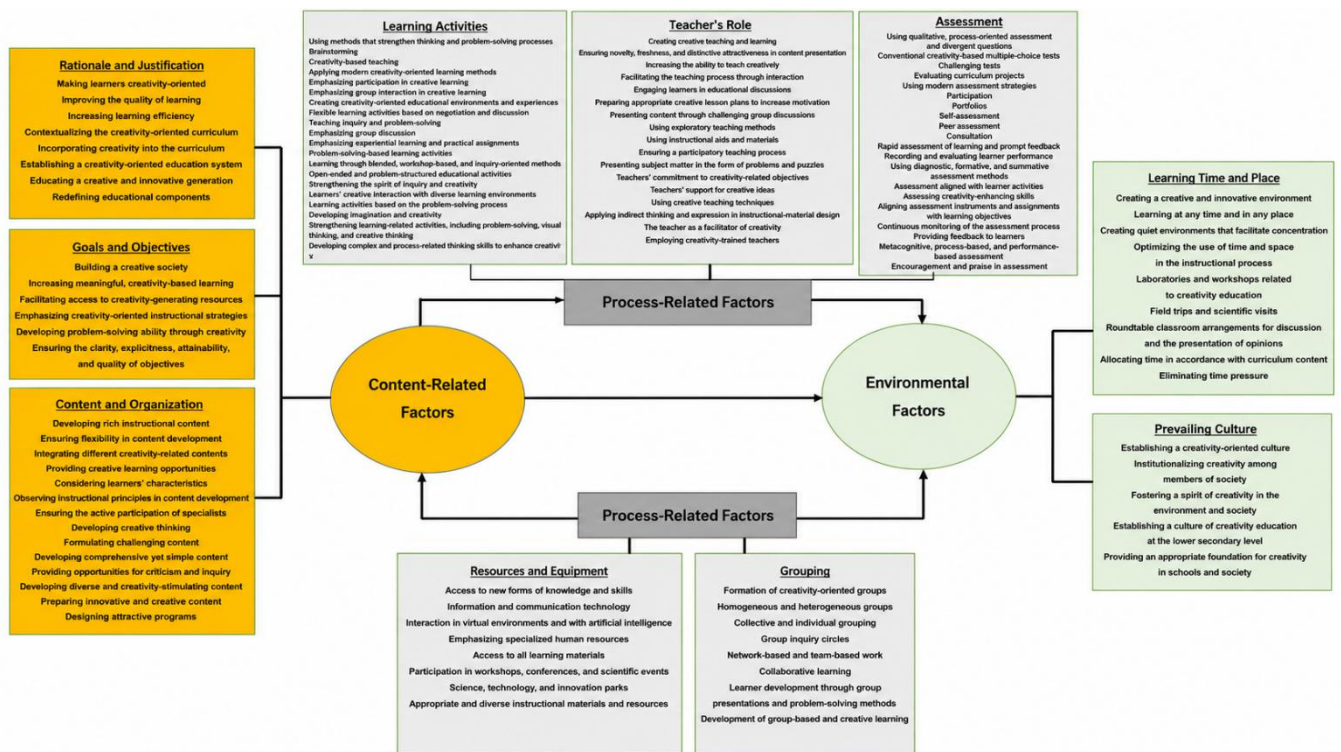


Figure 1. Creativity-Oriented Curriculum for Lower Secondary School Students

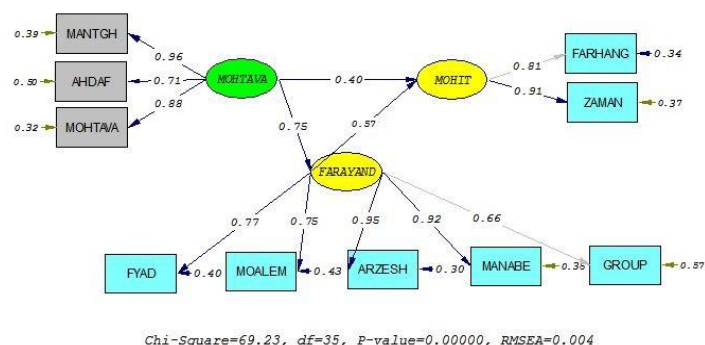
a. **Content-related factors**—the dimension of rationale and substance: the foundation determining the overall approach. This dimension addresses the philosophical and content-related foundations of the curriculum.

b. **Process-related factors**—the dimension of implementation: the mechanism for execution and operationalization. This dimension addresses how the curriculum is implemented and operationalized in the classroom.

c. **Environmental factors**—the contextual dimension: the supporting and facilitating environment. This dimension addresses the physical, psychological, and cultural conditions prevailing in the learning environment.

Research Question 2: How can the creativity-oriented curriculum model for lower secondary school students be validated?

After establishing the measurement models for evaluating the conceptual model of the study, structural equation modeling was used to examine the causal relationships among the variables and the extent to which the observed data fitted the model.



Chi-Square=69.23, df=35, P-value=0.00000, RMSEA=0.004

Figure 2. Measurement of the overall model in the standardized solution

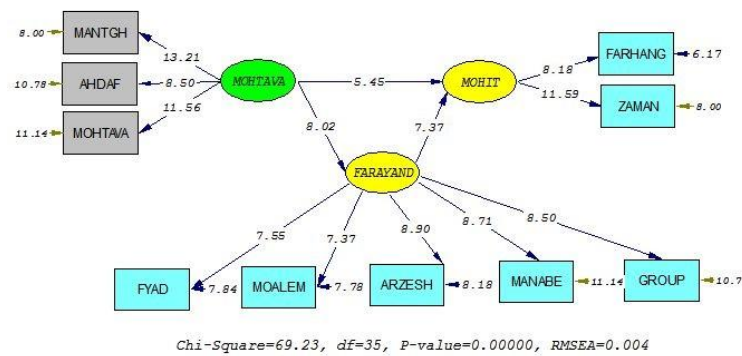


Figure 3. Measurement of the overall model in the significance-coefficient solution

Table 9. Results of the Relationships within the Model

Relationship	Path coefficient— β	t value	Result
Content-related factors $\rightarrow$ Process-related factors	.75	8.02	Positive and significant effect
Content-related factors $\rightarrow$ Environmental factors	.40	5.45	Positive and significant effect
Process-related factors $\rightarrow$ Environmental factors	.57	7.37	Positive and significant effect

According to the results presented in Table 9, the path coefficients were greater than .30, and the reported t values were greater than 1.96. It can therefore be concluded that all relationships within the model were confirmed.

After ensuring that the model was supported by an appropriate theoretical foundation, the degree of correspondence between the model and the collected data was examined. The results presented in Table 10 indicate that the fit indices demonstrate an acceptable fit between the model and the research data.

Table 10. Fit Indices for the Research Model

Index	NNFI	NFI	CFI	AGFI	GFI	RMR	RMSEA	p value	χ^2/df	GOF
Value	.91	.90	.90	.92	.93	.034	.042	.000	1.97	.803

Discussion and Conclusion

The present study sought to design and validate a context-specific creativity-oriented curriculum model for lower secondary school students. The findings showed that the proposed model comprised three interrelated dimensions—content-related, process-related, and environmental factors—organized into 10 components and 105 indicators. The content-related dimension included rationale and justification, goals and objectives, and content and organization. The process-related dimension consisted of learning activities, the teacher's role, assessment, resources and equipment, and grouping. The environmental dimension encompassed learning time and place and the prevailing culture. The quantitative findings also confirmed the structural relationships among these dimensions. Content-related factors had a strong positive and significant effect on process-related factors, content-related factors had a positive and significant effect on environmental factors, and process-related factors had a positive and significant effect on environmental factors. The model-fit indices further indicated that the conceptual model was consistent with the observed data. In addition, the content-related and process-related dimensions were evaluated as relatively favorable, whereas the environmental dimension was assessed as unfavorable. Taken together, these findings suggest that creativity-oriented curriculum development requires not only coherent curriculum design and appropriate instructional processes but also a supportive school environment capable of translating curricular intentions into sustained educational practice.

The identification of the content-related dimension as a foundational component of the model indicates that creativity must first be explicitly incorporated into the curriculum's rationale, objectives, and content structure. A curriculum cannot be

considered creativity-oriented merely because it includes occasional creative exercises; its philosophical orientation and intended learning outcomes must formally recognize creativity as a central educational competency. This finding is consistent with curriculum theory, which views curriculum as an interconnected system in which rationale, objectives, content, learning experiences, and assessment should be coherently aligned (2). It also corresponds with Eisner's argument that schools should offer rich and varied forms of educational experience rather than reduce learning to uniform, predetermined outcomes (3). From this perspective, the strong effect of content-related factors on process-related factors is theoretically meaningful because the rationale and objectives of a curriculum guide the selection of teaching strategies, learning activities, resources, and assessment procedures.

The content-related findings also emphasized the need for rich, flexible, challenging, and stimulating content that corresponds to learners' developmental characteristics and promotes inquiry, criticism, problem-solving, imagination, and creative thinking. This result aligns with the argument that classroom creativity depends partly on whether curriculum tasks permit students to generate, develop, and evaluate ideas rather than simply reproduce established information (5). Starko similarly maintains that creativity-oriented curricula should cultivate curiosity, provide meaningful challenges, and allow learners to explore multiple possibilities (25). The present findings therefore reinforce the view that curriculum content should be designed as an intellectual stimulus rather than a fixed body of facts. Content becomes creativity-enhancing when it invites students to ask questions, identify relationships, consider alternative interpretations, and apply knowledge to unfamiliar situations.

The emphasis on flexible content organization is also consistent with recent studies advocating flexible curricula based on creative learning principles in twenty-first-century education (15). Flexibility enables teachers and learners to adapt content, learning paths, resources, and products to individual differences and contextual conditions. This is especially important in lower secondary education, where students differ considerably in cognitive readiness, interests, motivation, prior knowledge, and modes of participation. The finding also supports research indicating that attention to individual differences and creative curriculum design can contribute to the transformation of educational approaches in the smart era (14). Accordingly, the model's content-related dimension should not be interpreted as prescribing unstructured or arbitrary learning; rather, it proposes a coherent curriculum that permits adaptation while maintaining clear creativity-related objectives.

The process-related dimension contained the largest number of components and indicators, demonstrating that creativity is primarily realized through the quality of classroom implementation. The identified learning activities included brainstorming, inquiry, problem-solving, discussion, negotiation, experiential learning, practical assignments, collaborative learning, open-ended tasks, blended methods, and workshop-based instruction. These findings are consistent with studies showing that active teaching methods strengthen creative thinking and scientific reasoning by requiring students to participate in exploration, discussion, analysis, and knowledge construction (17). They also align with research on integrated STEM project-based learning, which indicates that authentic and interdisciplinary activities can improve learners' critical-thinking and problem-solving abilities (9). Thus, the findings confirm that creativity-oriented instruction should move beyond passive content transmission and engage learners in processes of investigation, production, experimentation, and reflection.

The importance assigned to project-based and problem-oriented learning is further supported by the characteristics identified in research on project-based curricula. Such curricula emphasize meaningful objectives, authentic content, active learner participation, collaboration, sustained inquiry, resource use, product development, and performance-oriented assessment (10). The present model incorporated similar elements across its learning-activity, grouping, resource, and assessment components. This convergence suggests that creativity-oriented curriculum implementation benefits from instructional structures in which students work on complex tasks over time, exchange ideas, revise their products, and connect classroom learning with real-life

contexts. These approaches are particularly appropriate for lower secondary students because they can support both emerging abstract reasoning and the growing need for autonomy and peer interaction.

The teacher's role emerged as a major process-related component. The findings described the teacher as a facilitator of creativity who creates engaging learning experiences, uses exploratory and participatory methods, presents content through problems and puzzles, supports creative ideas, employs instructional materials, encourages interaction, and demonstrates commitment to creativity-oriented objectives. This finding is consistent with studies emphasizing the central role of teachers in the successful implementation of creativity-oriented curricula (16). A formal curriculum may articulate creative objectives, but those objectives remain largely aspirational unless teachers possess the knowledge, pedagogical competence, confidence, and professional autonomy needed to enact them.

The significance of the teacher's role is also supported by studies examining teachers' views on creativity in science and mathematics teaching. Teachers often recognize the value of creativity but report practical challenges related to time, assessment, curriculum demands, resources, and uncertainty about appropriate instructional methods (7). Research on science and creativity similarly suggests that creative learning requires teachers to combine disciplinary knowledge with inquiry, imagination, and open-ended exploration (8). Consequently, the teacher component of the present model should be understood as involving both pedagogical behavior and professional preparation. Creativity-oriented teaching requires systematic training rather than dependence on individual enthusiasm or improvisation.

The findings concerning the teacher's role also have implications for the hidden curriculum. Teachers communicate implicit messages about conformity, intellectual risk, authority, cooperation, and the value of students' ideas through their everyday interactions. Phenomenological evidence concerning teachers' lived experiences suggests that the hidden curriculum and the school's moral climate can affect the development of creative and critical thinking (18). A teacher may use creative activities while simultaneously discouraging unusual responses through rigid evaluation or dismissive feedback. Therefore, effective implementation requires congruence between explicit instructional strategies and the implicit relational climate of the classroom.

Assessment was identified as another central process-related component. The model emphasized qualitative, process-oriented, formative, performance-based, metacognitive, and divergent assessment, together with projects, portfolios, self-assessment, peer assessment, feedback, and evaluation of creativity-related skills. This finding reflects the need to align assessment with the multidimensional nature of creativity. Traditional examinations that privilege recall and convergent responses may conflict with curriculum objectives emphasizing originality, flexibility, inquiry, and problem-solving. Research on real-world creativity and mathematical problem-solving has similarly argued for assessment approaches that examine reasoning processes, alternative solution paths, originality, and the usefulness of responses rather than focusing exclusively on predetermined final answers (11). Thus, creativity-oriented assessment should not merely assign scores to products; it should guide learners in monitoring, evaluating, and improving their thinking.

The resources and equipment component included information and communication technology, artificial intelligence, virtual interaction, access to diverse learning materials, participation in workshops and scientific events, specialized personnel, and science and technology environments. This finding is consistent with research showing that technology-supported education can contribute to creativity and achievement when technological tools are integrated meaningfully into pedagogy (12). However, the potential of technology depends on how users perceive and actualize its affordances. Research on smart service systems has shown that technological opportunities are realized through the interactions and practices of multiple actors rather than through the mere presence of technical infrastructure (13). In educational settings, this means that devices, software, and

artificial intelligence cannot independently produce creativity; they must be connected to appropriate tasks, teacher guidance, collaboration, and reflective use.

Grouping was also identified as an important component of the process-related dimension. The model incorporated homogeneous and heterogeneous groups, individual and collective work, inquiry circles, teamwork, network-based learning, and collaborative problem-solving. This result reflects the social character of creativity. Although creativity includes individual cognition, ideas are frequently stimulated, challenged, refined, and implemented through interaction with others. Collaborative learning can expose students to alternative perspectives and encourage them to explain, defend, modify, or combine ideas. Nevertheless, grouping must be purposefully structured to prevent unequal participation, conformity, or domination by particular students. The inclusion of both individual and group arrangements in the model suggests that creativity development requires a balance between independent reflection and collaborative exchange.

The environmental dimension included the physical, temporal, psychological, and cultural conditions of learning. Although this dimension was positively affected by content-related and process-related factors, it received the lowest empirical evaluation and was considered unfavorable. This is one of the most significant findings of the study because it reveals a gap between curriculum design and implementation conditions. Schools may formally value creativity and teachers may attempt to use active methods, yet such efforts can be constrained by rigid schedules, unsuitable classroom arrangements, lack of quiet or flexible spaces, inadequate laboratories, limited opportunities for field experiences, time pressure, and an organizational culture that prioritizes conformity.

This finding strongly aligns with the systematic review of creative learning environments, which identified flexible space and time, access to resources, learner autonomy, supportive relationships, and an innovation-oriented culture as important conditions for creativity (6). It is also consistent with Amabile's argument that creativity can be weakened by excessive control, restrictive conditions, fear of evaluation, and insufficient autonomy (4). The unfavorable status of the environmental dimension therefore suggests that curriculum reform cannot be restricted to written objectives or classroom techniques. Without supportive institutional arrangements, creativity-oriented practices may remain temporary, fragmented, or dependent on individual teachers.

The cultural component of the environmental dimension is especially important. The model emphasized institutionalizing creativity, developing a creativity-oriented school culture, fostering a creative spirit in society, and preparing the school and community environment to support innovation. These findings correspond with the notion that creativity is influenced by social norms and organizational expectations. When schools value compliance more than inquiry, penalize mistakes, or interpret unusual ideas as disruptions, students may gradually avoid intellectual risk. Conversely, a culture that recognizes effort, encourages experimentation, and treats errors as part of learning can strengthen creative confidence. The lower score of this dimension may therefore reflect entrenched organizational routines that are more resistant to change than formal curriculum documents.

The overall structure of the model is compatible with previous national research. Studies developing creative education models for elementary students have similarly emphasized the coordination of objectives, content, teaching methods, activities, assessment, and contextual support (19). Research on creative learning within the secondary curriculum has also indicated that creativity must be embedded across curriculum structures and implementation processes (20). A research synthesis focused on creativity-oriented curricula for student teachers identified elements such as rationale, objectives, content, learning activities, teaching methods, resources, grouping, time, space, and assessment (21). The present study extends these findings by organizing the elements into three broader dimensions and empirically examining the relationships among them.

The findings are also consistent with subject-specific curriculum research. A creative-thinking-based mathematics curriculum model emphasized challenging content, problem-solving, active learning, and flexible instructional strategies (22). This supports the inclusion of content organization, learning activities, and assessment within the present model. Similarly, comparative research on curriculum models has emphasized the importance of coordinating content with learners' developmental needs and instructional conditions (23). Such alignment is particularly necessary in lower secondary education because students require both intellectual challenge and developmentally appropriate support.

The model also addresses the risk of a null curriculum in which creativity is endorsed rhetorically but excluded from actual learning experiences. When students are not given opportunities to question, imagine, design, collaborate, or create, these absent experiences communicate that creativity is secondary to content reproduction. Discussions of the null curriculum have drawn attention to the educational consequences of what schools omit as well as what they explicitly teach (24). The comprehensiveness of the present model can therefore help identify neglected curriculum elements and reduce the discrepancy between stated educational aspirations and students' actual experiences.

Finally, the model corresponds with future-oriented educational frameworks that identify creativity, collaboration, critical thinking, and adaptability as essential competencies for social and economic participation (1). A creativity-oriented curriculum for lower secondary education can contribute to these competencies by integrating creative objectives with active pedagogy, authentic assessment, digital resources, flexible grouping, and supportive learning environments. Nevertheless, the findings make clear that the environmental dimension must receive particular attention. The relative strength of content-related and process-related factors cannot compensate fully for weak infrastructure, restrictive scheduling, or unsupportive culture. Effective reform therefore requires coordinated action at the levels of curriculum policy, teacher education, school leadership, resource allocation, and organizational culture.

The present study had several limitations. The qualitative findings were based on interviews with curriculum experts and university faculty members and may not fully represent the perspectives of students, teachers, school administrators, parents, or policymakers directly involved in lower secondary education. The purposive sampling method was appropriate for model development but limits the statistical generalizability of the findings. The quantitative sample was also relatively small for structural equation modeling, and the model was evaluated through self-report judgments rather than through direct observation of curriculum implementation. In addition, the study assessed the perceived status of the dimensions at one point in time and did not examine whether implementation of the proposed model produces measurable changes in students' creativity, academic learning, motivation, or problem-solving performance. Differences among schools in terms of geographic location, socioeconomic conditions, technological facilities, leadership style, and organizational culture were not examined separately.

Future research should validate the model with larger and more diverse samples drawn from different regions, school types, and educational contexts. Students, classroom teachers, school leaders, parents, curriculum planners, and policymakers should be included to compare the perspectives of different stakeholder groups. Longitudinal and experimental studies are needed to evaluate the effects of implementing the model on students' creativity, critical thinking, academic achievement, motivation, collaboration, and problem-solving abilities. Researchers should also develop and validate practical instruments for assessing each component of the model at the classroom and school levels. Comparative studies could examine whether the relative importance of content-related, process-related, and environmental dimensions differs across subjects, grade levels, or cultural contexts. Further research should pay particular attention to environmental barriers, school leadership, teacher readiness, digital equity, and the organizational conditions required for sustainable implementation.

Curriculum planners should explicitly incorporate creativity into curriculum rationales, objectives, content standards, learning activities, and assessment frameworks rather than treating it as an optional enrichment outcome. Schools should

provide teachers with sustained professional development in inquiry-based teaching, project-based learning, open-ended questioning, collaborative learning, creative assessment, and the educational use of digital technologies and artificial intelligence. School leaders should create flexible schedules, adaptable classroom arrangements, access to laboratories and workshops, opportunities for scientific visits, and sufficient resources for experiential learning. Assessment practices should include projects, portfolios, self-assessment, peer assessment, performance tasks, and formative feedback. Teachers should be encouraged to support unusual ideas, normalize productive mistakes, and balance individual work with purposeful group interaction. Most importantly, educational authorities should prioritize the development of a school culture that values curiosity, experimentation, autonomy, psychological safety, and innovation so that the proposed curriculum can be implemented consistently rather than remaining limited to formal policy documents.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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References

1. Organisation for Economic C-o, Development. The Future of Education and Skills: Education 2030—The Future We Want. Paris: OECD Publishing, 2018.
2. van den Akker J. Curriculum Perspectives: An Introduction. In: van den Akker J, Kuiper W, Hameyer U, editors. Curriculum Landscapes and Trends. Dordrecht: Kluwer Academic Publishers; 2003. p. 1-10.
3. Eisner E. The Kind of Schools We Need: Personal Essays. Portsmouth, NH: Heinemann; 1998.
4. Amabile TM. How to Kill Creativity. Harvard Business Review. 1998;76(5):76-87.
5. Beghetto RA, Kaufman JC. Classroom Contexts for Creativity. High Ability Studies. 2014;25(1):53-69. doi: 10.1080/13598139.2014.905247.
6. Davies D, Jindal-Snape D, Collier C, Digby R, Hay P, Howe A. Creative Learning Environments in Education: A Systematic Literature Review. Thinking Skills and Creativity. 2013;8:80-91. doi: 10.1016/j.tsc.2012.07.004.

7. Johansen A, Mogstad E, Gajic B, Bungum B. Incorporating Creativity in Science and Mathematics Teaching: Teachers' Views on Opportunities and Challenges. *Nordic Studies in Science Education*. 2022;18(1):98-111.
8. Kelly O, Cutting R. *Primary Science and Creativity: Strange Bedfellows?* 2014.
9. Akhmad Y, Masrukhi M, Indiatmoko B. The Effectiveness of the Integrated STEM Project-Based Learning Model in Improving Elementary School Students' Critical Thinking Skills. *Educational Management*. 2020;9(1):9-16.
10. Saeednia A, Mahmoodi F, Imanzadeh A, Taghipour K. A Qualitative Review of the Characteristics of the Main Elements of the Project-Based Curriculum and Its Validation. *Iranian Journal of Curriculum Studies*. 2024;18(71):67-98.
11. Nilima J. A New Examination Approach for Real-World Creativity and Problem-Solving Skills in Mathematics. *Trends in Higher Education*. 2023;2(3):477-95.
12. Momeni Mehmoui H, Pakdaman M, Velari M. The Effect of Wiki and Weniki Educational Software on Creativity and Academic Achievement in Mathematics. *Information and Communication Technology in Experimental Sciences*. 2012;3(2):127-43.
13. Heinz D, Benz C, Bode J, Hunke F, Satzger G. Exploring the Potential of Smart Service Systems: A Multi-Actor View on Affordances and Their Actualization. *SMR - Journal of Service Management Research*. 2022;6(2):132-46.
14. Delavar A, Delgosha A, Rahnama Aghbagh H, Peykardar A, editors. *Examining the Effects of Attention to Individual Differences and Creative Curriculum on Transforming Educational Approaches for Students in the Smart Era*. Twenty-Third International Conference on Management and Humanities Research in Iran; 2026; Tehran.
15. Rezanegad Karimi FZ, Moradi Z, Fallah Aghamaleki M, editors. *Designing a Flexible Curriculum Based on Creative Learning Principles in Twenty-First-Century Education*. First Conference on Educational Sciences and Educational Leadership Studies in the Twenty-First Century; 2025; Babol.
16. Khaledi F, Shabani G, Ayaz N, editors. *Designing a Creativity-Oriented Curriculum: The Role of Teachers in Effective Implementation*. First International Conference on Artificial Intelligence in Education, Psychology, Educational Sciences, and Religious, Cultural, Social, and Management Studies in the Third Millennium; 2025; Bushehr.
17. Rezaei Dailari R, Ehsani Z, Abbaszadeh M, editors. *Examining the Effects of Active Teaching Methods on Students' Creative Thinking and Scientific Reasoning*. Second International Conference on Law, Management, Educational Sciences, Psychology, and Educational Planning Management; 2024; Tehran.
18. Golshan A, Kian M, editors. *A Phenomenological Exploration of Teachers' Lived Experiences of Teaching Fifth-Grade Mathematics within the Context of the Hidden Curriculum, School Moral Climate, and the Development of Students' Creative and Critical Thinking*. Eighth National Conference on Professional Research in Psychology and Counseling from the Teacher's Perspective; 2026; Bandar Abbas.
19. Fakhari Mobarakeh F, Etemad Ahari A, Saber Gorgani A. A Creative Education Model for Elementary School Students with Emphasis on the Sixth Grade. *Journal of Innovation and Creativity in Human Sciences*. 2022;12(45):197-228.
20. Hosseini MS, Sohrabi N, Baghouli H, Barzegar M. Developing a Creative Learning Model within the Structure of the Secondary Education Curriculum. *Quarterly Journal of Psychological Methods and Models*. 2021;12(44):133-48.
21. Rahbar A, Emamjomeh SMR, Essareh A, Hosseini Dehshiri AS. Explaining the Elements of a Creativity-Oriented Curriculum for Student Teachers: A Research Synthesis. *Journal of Innovation and Creativity in Human Sciences*. 2022;10(4):25-48.
22. Khashin Darghi H, Mahmoudi A, Habibi, Hamdollah. Designing a Curriculum Model Based on Creative Thinking for Sixth-Grade Mathematics. *Curriculum Studies*. 2025;20(76):35-60.
23. Ahmadi Gharacheh AM. A Comparative Study of Preschool Curriculum Models from the Perspectives of Faculty Members and Students. *Educational Leadership and Management*. 2015;4(2):43-53.
24. Salehi M, Dehghani M, Khattat M. *A Reflection on the Null Curriculum in Elementary Education*. 2023.
25. Starko AJ. *Creativity in the Classroom: Schools of Curious Delight*. 6th ed. New York: Routledge; 2018.