

AN IMPROVED MODEL FOR THE DEVELOPMENT OF LINGUISTIC MODELING SKILLS IN PRIMARY SCHOOL MOTHER TONGUE EDUCATION

Jurabayeva Zarnigor Zokhidjon kizi,

Independent Researcher, Namangan State Pedagogical Institute.

E-mail: zarnigorjurabayeva95@gmail.com

Abstract. This article explores the theoretical and methodological foundations of developing linguistic modelling skills in primary school students and presents an improved model for their formation. It analyzes the cognitive, practical, and creative components in an integrated way and highlights their role in enhancing the effectiveness of mother tongue instruction. A four-stage model (diagnostic, preparatory, organizational, and assessment stages) is also described using Grade 4 mother tongue lessons as an example. The findings confirm that linguistic modelling is an effective tool for the systematic acquisition of grammatical knowledge, the development of logical and creative thinking, and the improvement of students' communicative competence.

Keywords: linguistic modeling, mother tongue education, primary education, linguistic competence, grammatical models, cognitive component, creative component, interactive teaching methods.

BOSHLANG'ICH SINIF ONA TILI DARSLARIDA LINGVISTIK MODELLASHTIRISH MALAKASINI RIVOJLANTIRISHNING TAKOMILLASHTIRILGAN MODEL

Jurabayeva Zarnigor Zokhidjon qizi,

Namangan davlat pedagogika instituti mustaqil tadqiqotchisi

Annotatsiya. Mazkur maqolada boshlang'ich sinf o'quvchilarida lingvistik modellashtirish ko'nikmalarini rivojlantirishning nazariy va metodik asoslari hamda takomillashtirilgan modeli yoritilgan. Tadqiqotda kognitiv, amaliy va kreativ komponentlarning integratsiyasi va ularning ona tili ta'limi samaradorligini oshirishdagi o'rni tahlil qilingan. Shuningdek, 4 bosqichli (diagnostik, tayyorlov, tashkiliy va baholash) model 4-sinf ona tili darslari misolida ko'rsatib berilgan. Natijalar lingvistik modellashtirish grammatik bilimlarni tizimli o'zlashtirish, mantiqiy va ijodiy fikrlashni rivojlantirish hamda kommunikativ kompetensiyani oshirishda samarali vosita ekanini tasdiqlaydi.

Kalit so'zlar: lingvistik modellashtirish, ona tili ta'limi, boshlang'ich ta'lim, lingvistik kompetensiya, grammatik modellar, kognitiv komponent, kreativ komponent, interfaol metodlar.

УСОВЕРШЕНСТВОВАННАЯ МОДЕЛЬ ФОРМИРОВАНИЯ НАВЫКОВ ЛИНГВИСТИЧЕСКОГО МОДЕЛИРОВАНИЯ НА УРОКАХ РОДНОГО ЯЗЫКА В НАЧАЛЬНЫХ КЛАССАХ

Журабаева Зарнигор Зохидажон кизи,

Независимый исследователь Намаганского государственного педагогического института.

Аннотация. В данной статье рассматриваются теоретические и методические основы развития навыков лингвистического моделирования у учащихся начальных классов и представлена усовершенствованная модель их формирования. Анализируются когнитивный, практический и креативный компоненты, а также их роль в повышении эффективности обучения родному языку. Описана четырёхэтапная модель (диагностический, подготовительный, организационный и оценочный этапы), которая показана на примере уроков родного языка в 4 классе. Результаты исследования подтверждают, что лингвистическое моделирование является эффективным средством системного усвоения грамматических знаний, развития логического и творческого мышления, а также коммуникативной компетенции учащихся.

Ключевые слова: лингвистическое моделирование, обучение родному языку, начальное образование, лингвистическая компетенция, грамматические модели, когнитивный компонент, креативный компонент, интерактивные методы обучения.

INTRODUCTION

The contemporary stage of educational system development identifies the formation of 21st-century competencies in students as one of its highest priorities. These competencies include analytical thinking, problem-solving, creative thinking, and the ability to engage in independent learning. In achieving these objectives, primary education occupies a pivotal role. It is during this stage that students develop the ability to understand linguistic phenomena on a scientific basis, systematically acquire grammatical concepts, and apply them effectively in practical language use.

In recent years, organizing mother tongue education based on the competency-based approach has become one of the major directions of educational research. Within this approach, the learner is viewed not as a passive recipient of ready-made knowledge, but as an active participant who is capable of independently analyzing, synthesizing, and applying knowledge in new contexts. From this perspective, linguistic modeling is regarded as an effective didactic tool that promotes students' deep understanding of grammatical concepts.

Linguistic modeling enables the representation of language phenomena through diagrams, tables, algorithms, concept maps, or graphical models, thereby simplifying complex grammatical relationships and making them more accessible to learners. As a

result, students do not merely memorize grammatical rules but begin to understand their underlying logic and structural relationships. Therefore, the development of linguistic modeling skills is considered an important factor in fostering students' cognitive abilities, language performance, and communicative competence [4].

Recent studies indicate that linguistic modeling enhances learners' ability to identify relationships among language units, organize grammatical knowledge into coherent conceptual structures, generalize linguistic patterns, and transfer acquired knowledge to new learning contexts. Through the use of concept maps, graphical representations, and other visual modeling techniques, students develop deeper conceptual understanding rather than relying solely on rote memorization. This process promotes analytical and critical thinking while facilitating a more comprehensive understanding of language structures. In primary education, modeling activities related to word structure, parts of speech, phonetics, and morphology have been shown to strengthen learners' grammatical reasoning and improve their ability to apply grammatical concepts in authentic communicative situations [3].

Psychological and educational research increasingly recognizes model-based learning as an effective pedagogical approach for enhancing students' cognitive engagement and knowledge construction. By engaging learners in the creation, interpretation, and revision of models, this approach promotes conceptual understanding, analytical reasoning, and meaningful learning rather than rote memorization. Model-based instruction also supports the development of higher-order thinking skills by enabling students to organize knowledge systematically and apply it to novel learning situations [1].

In current primary education practice, linguistic modeling is frequently confined to individual classroom activities, such as completing tables or constructing simple diagrams. The absence of a comprehensive methodological framework that systematically supports the development of grammatical concepts limits students'

opportunities to acquire and apply linguistic competence effectively. Consequently, the enhancement of linguistic modeling through the integration of cognitive, practical, and creative components has become an important research and methodological priority.

This study aims to develop an improved model for enhancing linguistic modeling skills in primary school mother tongue education and to validate its methodological effectiveness. To accomplish this objective, the structural components of linguistic modeling were examined, a stage-based framework for the development of linguistic concepts was proposed, and practical implementation strategies were illustrated through selected grammar topics.

MATERIALS AND METHODS

This study is aimed at improving the methodological foundations for developing linguistic modeling skills in primary school mother tongue instruction. To achieve the research objectives, a combination of theoretical and empirical methods was employed. During the theoretical phase, scholarly literature on linguodidactics, pedagogy, educational psychology, and the competency-based approach was critically analyzed to clarify the concept of linguistic modeling and identify its structural components. In addition, previous methodological studies on the development of grammatical concepts in primary education were systematically reviewed. Based on the findings of this analysis, an enhanced model of linguistic modeling was developed to support the systematic formation of students' grammatical knowledge and skills.

The research methodology was grounded in the principles of constructivist learning theory and the competency-based approach. According to these perspectives, learners are regarded not as passive recipients of ready-made knowledge but as active participants who construct, analyze, and apply knowledge independently in authentic learning contexts. Accordingly, the proposed linguistic modeling approach was designed to enhance students' cognitive engagement, foster logical reasoning, and support creative thinking throughout the learning process. These principles served as the core

methodological foundation for the development and implementation of the instructional model.

The study focused on grammar topics taught in Grade 4 mother tongue classes. In particular, the topics *“Nouns with Possessive Suffixes”* and *“Nouns with Case Suffixes”* were selected as the instructional content for implementing linguistic modeling. These topics were considered appropriate because they involve well-structured grammatical relationships, offer broad opportunities for visual and conceptual modeling, and effectively promote students’ analytical thinking and grammatical reasoning [2].

The proposed instructional model comprises three interconnected components: cognitive, practical, and creative. The cognitive component focuses on fostering students’ understanding of linguistic phenomena, strengthening their comprehension of grammatical regularities, and developing linguistic reasoning. During this phase, learners examine the role of possessive suffixes in expressing person and number, identify the relationships between grammatical elements, and organize these relationships into systematic conceptual models.

The practical component of the proposed instructional model was implemented through a sequence of linguistic operations designed to facilitate the application of grammatical knowledge in authentic learning activities. Various instructional strategies, including comparison, grouping, classification, and transformation, were employed to promote students’ analytical reasoning and procedural understanding of grammatical concepts. The practical activities developed for the topic of possessive suffixes are presented in Table 1.

Table 1. Practical Component of the Proposed Linguistic Modeling Framework

Instructional Method	Learning Activity	Expected Learning Outcome
-------------------------	-------------------	---------------------------

Comparison	Students compare possessive suffixes in singular and plural noun forms.	Develop an understanding of grammatical similarities and differences between possessive forms.
Grouping	Students categorize possessive suffixes according to grammatical person (first, second, and third person).	Strengthen the ability to identify systematic grammatical patterns.
Classification	Students classify phonetic changes that occur when possessive suffixes are attached to nouns.	Improve understanding of phonological and morphological regularities.
Transformation	Students transform a noun into different possessive forms by changing grammatical person and number.	Develop the ability to apply grammatical rules flexibly in new linguistic contexts.

Visual modeling tools, including tables, algorithms, diagrams, and structural schemes, constituted an essential methodological component of the proposed instructional model. Possessive suffixes were organized into tables according to grammatical person, diagrams were employed to represent the relationships among grammatical forms, and algorithmic models illustrated the decision-making process for selecting appropriate suffixes in different linguistic contexts. By presenting grammatical concepts in a structured visual format, these models enhanced students' conceptual understanding, promoted meaningful learning, and strengthened their grammatical reasoning skills.

The creative component focused on fostering students' ability to develop independent linguistic models, engage in exploratory language activities, and transfer

grammatical knowledge to new communicative contexts. Learners applied possessive suffixes across different lexical items, analyzed phonological adaptation patterns, identified exceptional cases, and independently created visual representations, including diagrams and tables, to illustrate grammatical relationships. Consequently, linguistic modeling evolved beyond a tool for learning grammar and became an effective instructional strategy for promoting creativity, independent problem-solving, and higher-order cognitive skills.

The development of linguistic concepts was organized according to a four-stage instructional model. The first stage, referred to as the diagnostic stage, was designed to assess students' prior knowledge and identify their initial understanding of the target grammatical concepts. At this stage, the INSERT (Interactive Noting System for Effective Reading and Thinking) strategy was employed, enabling students to evaluate their knowledge by using the indicators *"I know," "New information," "Contradicts my prior knowledge,"* and *"I do not understand."* This strategy promoted reflective thinking by encouraging learners to monitor their own understanding, identify misconceptions, and recognize areas requiring further learning.

The second stage, the preparation stage, focused on planning and activating students' prior knowledge. During this phase, the teacher organized the instructional content according to the curriculum across the academic term, while students used the KWL (Know–Want to Know–Learned) strategy to activate their existing knowledge, identify learning goals, and prepare cognitively for the acquisition of new concepts. The use of the KWL strategy encouraged self-assessment, promoted metacognitive awareness, and strengthened students' capacity for self-directed learning.

The third stage, the implementation stage, focused on developing and applying linguistic models. Teachers designed models aligned with grammar topics, while students created their own based on examples. The fourth stage, the evaluation stage, assessed students' linguistic modelling skills through a multidimensional framework

covering cognitive, practical, and creative aspects, ensuring a holistic evaluation of grammatical competence.

Overall, the proposed methodology integrates theoretical analysis, pedagogical modelling, interactive strategies, and competency-based assessment into a unified framework. This approach effectively supports the implementation of linguistic modelling in primary education and promotes the development of grammatical and communicative competence as well as higher-order thinking skills.

RESULTS

The enhanced linguistic modeling framework developed in this study was examined as an effective instructional mechanism for fostering grammatical concepts among primary school students. The principal advantage of the proposed model lies in its emphasis on promoting students' conceptual understanding of grammatical phenomena rather than the mere memorization of grammatical rules. It encourages learners to identify relationships among linguistic units, interpret underlying grammatical patterns, and formulate independent conclusions through analytical reasoning. The framework is structured around three interrelated components – cognitive, practical, and creative – which function as an integrated pedagogical system. While each component performs a distinct role in the development of linguistic competence, their interaction provides a comprehensive and systematic approach to grammar instruction, thereby supporting students' conceptual understanding, practical application of grammatical knowledge, and creative language use.

The findings of the study demonstrated the central role of the cognitive component in the linguistic modeling process. This component enables students to observe linguistic phenomena, distinguish grammatical units, understand the relationships among them, and generalize grammatical patterns. For example, when studying the topic "*Nouns with Possessive Suffixes*," students first develop an understanding of the role of possessive suffixes in expressing grammatical person and number. They then analyze the

phonological variants of these suffixes and identify the rules governing their use in different linguistic contexts. This sequential learning process promotes the meaningful acquisition of grammatical concepts, allowing students to develop a deeper conceptual understanding rather than relying on the memorization of grammatical rules.

During cognitive activity, students' analytical thinking also developed. For example, by working with examples such as "kitob," "kitobim," "kitobing," and "kitobi," they came to understand that changes in grammatical form also lead to changes in meaning. This ensured that grammatical knowledge was acquired in connection with semantic content. As a result, students began to approach grammatical phenomena not from a formal perspective, but from a functional one.

In the process of introducing the practical component, students' skills in performing linguistic operations developed significantly. In particular, comparison, grouping, classification, and transformation exercises enabled the integration of grammatical knowledge with practical activity. In comparison exercises, students identified the similarities and differences between possessive suffixes in singular and plural forms. In grouping tasks, they systematized grammatical units based on specific criteria. During classification, connections between phonetic phenomena and grammatical forms were identified, while in transformation exercises, students developed the ability to use words in different grammatical forms.

Visual models played an important didactic role in enhancing the effectiveness of linguistic modelling. During the research, tables, diagrams, algorithms, and structural schemes were used. In table-based models, the classification of grammatical units was presented in a concise and systematic form. Diagrams visually demonstrated the interrelationships between grammatical categories. Algorithmic models enabled step-by-step selection of grammatical affixes. Such tools helped students understand the topic more easily and retain it for a longer period of time.

During the research, the role of the creative component in developing students' independent thinking was also identified. Students were not limited to working only with ready-made models; they were also involved in creating new models. They demonstrated a creative approach by generalizing grammatical rules, developing various schemes, and conducting linguistic experiments. In particular, linguistic models created by the students themselves indicated a deep mastery of grammatical knowledge. This situation confirms that students acquired knowledge not at a reproductive level, but at a productive level.

The four-stage model of forming linguistic concepts also demonstrated high methodological effectiveness. In the diagnostic stage, students' prior knowledge was identified using the INSERT strategy, and their individual needs were determined. This made it possible to implement a differentiated approach in the subsequent stages.

In the preparatory stage, the use of the KWL (Know–Want to know–Learned) technology activated students' prior knowledge and increased their motivation to master new topics. By independently assessing their own knowledge, students became active participants in the learning process. This contributed to the development of reflective activity, which is one of the key principles of the competency-based approach.

In the organizational stage, lessons were conducted based on linguistic models developed by the teacher. Pupils analyzed these models and subsequently created their own models based on them. Independent modelling activity had a positive impact on the deeper understanding of grammatical knowledge, making correct decisions in problem situations, and developing creative thinking.

The evaluation stage of the research was based on a multi-criteria assessment system designed to provide a comprehensive measurement of students' linguistic modelling competence. This system ensured an objective and systematic analysis of learners' cognitive, practical, and creative achievements. In particular, it allowed for the identification of different levels of grammatical knowledge formation through clearly

defined indicators. The main criteria and their pedagogical significance are presented in the table below.

Stage	Description	Educational Impact
Evaluation stage	A multi-criteria assessment system developed in this stage enabled a comprehensive evaluation of students' linguistic modelling skills.	Provided an objective determination of the level of grammatical knowledge formation through a structured and holistic approach.
Cognitive criteria	Assessment criteria covered cognitive activities.	Helped identify students' understanding, analytical thinking, and conceptual grasp of grammatical knowledge.
Practical criteria	Assessment included practical application of linguistic knowledge.	Evaluated students' ability to apply grammatical rules in real tasks and language use.
Creative criteria	Assessment also focused on creative activity.	Enabled identification of higher-order competencies such as model creation, adaptation, and innovation in linguistic tasks.
Overall significance	The criteria included model creation, practical application, and development of new models.	Played a key role in determining students' advanced competency levels in linguistic modelling.

DISCUSSION

The results of the discussion show that interactive methods further enhance the effectiveness of linguistic modelling. In particular, the use of INSERT and KWL technologies helped students analyze their own knowledge, engage in self-assessment, and consciously acquire new information. These methods not only developed reflective

thinking but also increased students' active participation in the learning process. Therefore, the integration of linguistic modelling with modern pedagogical technologies is considered one of the key factors in improving educational effectiveness.

CONCLUSION

Based on the results of the conducted research, the following scientific conclusions were reached:

First, linguistic modelling is an effective didactic tool for forming grammatical concepts in primary school mother tongue education. Through modelling, students understand the internal logic of language phenomena, systematize them, and acquire the ability to apply them independently in practice.

Second, the improved model, consisting of cognitive, practical, and creative components, provides integrated development of students' linguistic competencies. This model ensures step-by-step acquisition of grammatical knowledge and develops learners' logical and creative thinking.

Third, the methodological model of linguistic concept formation, which includes diagnostic, preparatory, organizational, and evaluation stages, enables systematic organization of the learning process. The use of interactive methods such as INSERT and KWL significantly contributes to the development of students' reflective activity, self-assessment, and independent learning skills.

Fourth, integrating linguistic modelling with digital educational platforms further enhances the quality of primary education. Interactive models present grammatical concepts in a visual, structured, and engaging form for students.

References

1. Carroll, G., & Park, S. (2026). Towards expansive model-based teaching: A systematic synthesis of modelling pedagogies in science education literature. *Studies in Science Education*, 62(1), 1–39. <https://doi.org/10.1080/03057267.2024.2417157>
2. Baynazarova D.D., Toirova M.E. *Mother Tongue. Grade 4. Part IV: Textbook for General Secondary Schools*. – Tashkent: Novda Edutainment, 2023. – 88 p.

3. Su F., Zou D. A comparative review of technology-assisted and non-technology concept mapping-based language learning // *International Journal of Educational Research Open*. – 2024. – Vol. 6. – Article 100319. – DOI: [10.1016/j.ijedro.2024.100319](https://doi.org/10.1016/j.ijedro.2024.100319)
4. Van Rijt, J., de Swart, P., & Coppen, P. A. (2019). Linguistic concepts in L1 grammar education: a systematic literature review. *Research Papers in Education*, 34(5), 621–648. <https://doi.org/10.1080/02671522.2018.1493742>