Sino-US English Teaching, Mar.-Apr. 2026, Vol. 23, No. 3-4, 73-88
doi:10.17265/1539-8072/2026.02.005

A Multimodal Approach to Artificial Bilingualism: Thematic Instruction in Ukrainian-English Primary Education

Nataliia Tokareva, Maryna Tsehelska
Kryvyi Rih State Pedagogical University, Kryvyi Rih, Ukraine

Integrating bilingual literacy through thematic instruction at Interclass Bilingual Primary School is the focus of this study. The pedagogical approach combines thematic content with visual concept maps, enabling students to acquire and categorize transport-related vocabulary in both Ukrainian and English. The design addresses the unique context of artificial bilingualism, where English functions as a foreign language, Ukrainian as the primary language of schooling, and Russian as the home language. Through multimodal activities, students produce simple sentences in English while expanding thematic understanding in Ukrainian. Comparative charts facilitate cross-linguistic analysis, promoting language awareness and bilingual competence. The findings demonstrate that structured bilingual instruction, grounded in thematic and visual representation, enhances cognitive engagement and supports meaningful knowledge transfer between languages, contributing to holistic literacy development.

Keywords: bilingual literacy, thematic instruction, transport vocabulary, Grade 1, artificial bilingualism, language awareness, Ukrainian-English integration, concept maps, metacognitive schemes, multimodal activities

Introduction

The rapid digital transformation of the modern world has significantly shaped the cognitive and linguistic behaviors of today's learners, including those in bilingual educational settings. As digital natives, young students are increasingly accustomed to multitasking, visual processing, and the frequent use of simplified language structures. These tendencies present both challenges and opportunities in bilingual education, where fostering linguistic depth and cognitive engagement is essential for academic success.

At Interclass Bilingual Primary School in Kryvyi Rih, Ukraine, the pedagogical approach to bilingual literacy is grounded in the Integrated Literacy Development Approach (ILDA)—a methodology specifically designed to address the complexities of early bilingual education within multilingual contexts. In a setting marked by artificial bilingualism—where Russian remains the dominant home language, Ukrainian serves as the medium of instruction, and English is introduced as a foreign language—language development must be both intentional and cognitively scaffolded.

ILDA responds to this need by integrating thematic content, visual organization, and genre-based instruction. The approach promotes metacognitive engagement through the use of concept maps and algorithmic schemes that guide learners in planning, organizing, and monitoring their language production in both Ukrainian and

Nataliia Tokareva, Doctor of Science, professor, Psychology Department, Kryvyi Rih State Pedagogical University, Kryvyi Rih, Ukraine.
Maryna Tsehelska, Ph.D., associate professor, English Language and Methodology Department, Kryvyi Rih State Pedagogical University, Kryvyi Rih, Ukraine.

English. Instruction is thematic in nature, beginning with bilingual concept maps in which vocabulary and structures from both languages appear side by side. Themes, such as “Plants” or “Animals” are deliberately selected for their accessibility and cognitive potential, providing meaningful contexts in which language and content can develop simultaneously.

These bilingual concept maps function as cognitive bridges, allowing students to visually anchor new vocabulary, concepts, and basic sentence structures in both languages. As students gain proficiency—typically by the second semester of Grade 1—they transition to creating parallel concept maps, one in each language. This pedagogical shift signals a deeper level of cognitive engagement and marks a move from translational understanding to independent structuring of meaning in each language. It also fosters metalinguistic awareness, as learners begin to compare linguistic patterns, syntactic structures, and discourse conventions across languages.

Prior classroom-based research at Interclass (Tokareva & Tsehelska, 2020) affirms the effectiveness of ILDA in supporting meaningful bilingual development. The approach moves beyond rote memorization, emphasizing cognitive-linguistic integration through reflective, scaffolded tasks. As students advance, they acquire the foundational skills necessary for biliteracy and academic success in a multilingual environment.

This article presents the theoretical underpinnings and classroom applications of the ILDA, focusing on its implementation through thematic instruction in Grade 1. Drawing on the themes of “Plants” and “Animals,” it illustrates how early learners are guided from shared bilingual frameworks to parallel, language-specific outputs—strengthening their bilingual literacy and metacognitive competencies.

Literature Review and Theoretical Derivation

Bilingual education has long been recognized as a powerful framework for fostering cognitive development, linguistic awareness, and academic achievement among language-minority learners (August & Shanahan, 2006; Cummins, 2000). In contexts of artificial bilingualism—where children are simultaneously exposed to multiple languages across school and home settings without native fluency in either—structured and intentional pedagogical approaches become particularly crucial.

Research by Aquino-Sterling and Salcedo-Potter (2019) highlights how educators’ beliefs about bilingualism and dual language development shape instructional strategies and student outcomes. These beliefs, when grounded in research-based understanding, support the implementation of responsive and effective bilingual pedagogies. Cummins (2007) emphasized the need to move beyond monolingual instructional strategies and embrace cross-linguistic transfer, where the development of one language supports the development of another.

The cognitive advantages of bilingualism are well documented. Bialystok (2018) noted that bilingual education enhances metalinguistic awareness—students’ ability to reflect on and manipulate language structure—which is crucial for literacy development. Flavell’s (1979) seminal work on metacognition provides a theoretical foundation for using tools such as concept maps and reflection tasks to support young learners in monitoring and regulating their own learning.

Recent studies reinforce the role of metacognitive and visual strategies in bilingual education. Novak and Cañas (2008) outlined the theoretical principles underlying concept maps, highlighting their utility in organizing knowledge, forming relationships between concepts, and enhancing comprehension. Tokareva and Tsehelska (2020) expanded this application to language learning, showing that metacognitive schemes help young learners internalize grammatical structures and organize vocabulary in meaningful, memorable ways. These findings are

particularly relevant in Ukrainian bilingual classrooms, where learners often operate in Russian, Ukrainian, and English simultaneously (Tsehelska, 2018; Tokareva, 2023).

The role of visual and thematic instruction is supported by Cahyati, Parmawati, and Atmawidjaja (2019), who demonstrate that engaging young learners through themes and real-life contexts increases participation and retention. Frigolé and Tresserras (2023) similarly advocated for culturally responsive and multilingual teaching practices that reflect students' linguistic backgrounds. In these environments, translanguaging—fluidly using multiple languages to express ideas—is a natural and beneficial process (García & Wei, 2014).

Vocabulary development, a cornerstone of early literacy, is influenced by exposure and use across languages. Giguere and Hoff (2023) found that bilingual children's vocabulary skills predict reading comprehension in the same language but not across languages, underscoring the importance of parallel language instruction. Persici et al. (2022) added that both home language exposure and parental proficiency significantly affect language development, suggesting that school strategies must compensate for imbalanced language input.

The use of structured thematic instruction supports both vocabulary acquisition and sentence construction. Thematic units, such as "Plants and Animals," framed through bilingual concept maps, foster semantic networks that facilitate language transfer and conceptual clarity (Marks et al., 2022; Tokareva, 2022). Garton and Copland (2019) emphasized the importance of introducing vocabulary through real-life contexts for young learners, enhancing motivation and contextual understanding.

Shymko (2021) and Tokareva (2018) contributed to the theoretical grounding from a psycholinguistic perspective, suggesting that structured, concept-based language development aids in forming logical-semantic connections essential for abstract thinking. Their findings support the integration of linguo-cognitive models and discourse-based instruction into early bilingual education.

Taken together, these works form a solid theoretical and empirical foundation for implementing structured bilingual instruction through metacognitive and visual strategies. This pedagogical approach is particularly vital in artificial bilingual contexts, where learners may not receive balanced or consistent language exposure in either of the target languages. By leveraging thematic instruction, concept mapping, and reflective practice, educators can foster both linguistic competence and cognitive development in young bilingual learners.

Sample

The sample for this study comprises Grade 1 students at Interclass Bilingual Primary School in Kryvyi Rih, Ukraine. The school operates in a complex multilingual environment characterized by "artificial bilingualism, " in which Russian remains the predominant home language, Ukrainian is used as the primary medium of instruction, and English is introduced as a foreign language from the outset of formal education. This linguistic landscape presents both challenges and opportunities for fostering balanced bilingual literacy, especially in early primary education.

The participants in this study are in their initial year of formal bilingual instruction and are at the emergent stage of literacy development in both Ukrainian and English. Most learners enter school with functional fluency in Russian but require structured support to acquire academic Ukrainian and communicative competence in English. As such, the context necessitates a pedagogical framework that is not only linguistically responsive, but also cognitively engaging to support both language awareness and the foundational skills of biliteracy.

Instruction is thematically organized around age-appropriate and contextually relevant topics drawn from the learners' everyday experiences. One such theme, "Plants," serves as a foundational unit for the integrated

development of vocabulary, sentence structures, and comparative linguistic awareness. The topic is accessible, relatable, and sufficiently broad to facilitate the introduction of concrete lexical items as well as emerging narrative competence.

The implementation of the ILDA in this context is guided by the following interconnected strategies:

1. Concept Mapping: Learners are introduced to bilingual concept maps that present key transport-related vocabulary in both English and Ukrainian. These visual tools support vocabulary acquisition, enhance semantic organization, and highlight cross-linguistic conceptual parallels;

2. Metacognitive Schemes: As learners progress, they employ simple, genre-based planning schemes and algorithmic organizers to structure and monitor their language production. This metacognitive scaffolding promotes autonomy and reflection in language use;

3. Multimodal Engagement: Thematic activities incorporate visual, kinesthetic, and verbal modalities to accommodate diverse learning styles and reinforce conceptual understanding through multiple channels.

Implementation Sequence:

1. Initial Bilingual Mapping: Students engage with a bilingual concept map centered on the topic "Plants," with visual representations and labels in both English and Ukrainian, establishing a shared semantic framework;

2. Vocabulary Development in English: Through the use of visual aids, physical gestures, and sentence starters, students produce basic descriptive sentences using transport-related vocabulary;

3. Thematic Expansion in Ukrainian: Once, core concepts are familiar, learners expand their output in Ukrainian using comparative and descriptive structures;

4. Parallel Concept Mapping: In the second semester, students transition to creating separate concept maps in English and Ukrainian, promoting independent lexical and grammatical processing while maintaining cognitive alignment across languages;

5. Cross-Linguistic Reflection: Facilitated by the teacher, learners engage in guided comparisons of syntactic structures, such as word order and article usage, to develop metalinguistic awareness and cognitive flexibility;

6. Practical Application through Role Play and Storytelling: To reinforce vocabulary in meaningful contexts, students participate in simple role plays (e.g., purchasing a ticket and discussing transport preferences) and engage in short narrative tasks that integrate the thematic vocabulary into cohesive discourse.

This structured and recursive approach, grounded in ILDA principles, aims to foster balanced bilingual literacy by building language awareness, promoting metacognitive regulation, and supporting expressive capabilities across both languages from the earliest stages of formal education.

Research Methods and Techniques

The study investigated the theoretical and practical aspects of integrating metacognitive schemes into bilingual literacy development at the Interclass Bilingual Primary School. A mixed-method approach was employed, combining theoretical and empirical research methods to examine the effectiveness of metacognitive strategies in enhancing bilingual literacy.

Theoretical methods. The theoretical phase involved an in-depth analysis of psycholinguistic, cognitive, and educational literature to explore how metacognitive schemes facilitate language acquisition in young bilingual learners. Key theoretical approaches, such as Flavell's (1979) concept of metacognition and Vygotsky's (1978) sociocultural theory, informed the study's framework. The literature analysis focused on identifying cognitive processes involved in bilingual literacy development, generalizing analytical data to recognize

recurring patterns, and determining predictors of successful literacy instruction. Based on these insights, the study formulated conclusions about effective strategies for integrating metacognitive activities in bilingual education.

Empirical methods. The empirical part of the study utilized both qualitative and quantitative research techniques.

1. Observation Method:

Classroom observations were conducted to assess how students engaged with metacognitive schemes during bilingual literacy lessons. Special attention was given to:

(a) Student engagement and active participation in tasks involving concept maps and thematic instruction;

(b) The application of metacognitive strategies, such as self-monitoring and planning, during language activities;

(c) Interaction patterns among students when discussing bilingual concepts;

(d) The collected data were systematically analyzed using content analysis to identify patterns in language use and cognitive engagement.

2. Semi-Structured Interviews:

To gain deeper insights, semi-structured interviews were conducted with both teachers and students. These interviews explored perceptions of the effectiveness of metacognitive schemes in bilingual education, challenges encountered during their application, and observed improvements in language skills. Teachers shared their reflections on implementing visual and thematic instruction, while students provided feedback on their learning experiences.

3. Statistical Analysis:

To evaluate the effectiveness of the implemented strategies, a one-factor variance analysis (Fisher's φ-criterion) was employed. This statistical method assessed whether observed improvements in students' bilingual literacy skills—such as vocabulary expansion, sentence construction, and cross-linguistic awareness—were statistically significant.

By combining theoretical grounding, qualitative insights, and quantitative validation, the study offered a comprehensive understanding of how metacognitive strategies can enhance bilingual literacy development in young learners, particularly within the context of artificial bilingualism at the Interclass Bilingual Primary School.

Results

The results of the study demonstrate that the integration of metacognitive schemes within thematic bilingual instruction significantly contributes to both language development and cognitive growth in early learners. Observational data collected during classroom sessions indicated heightened student engagement and improved conceptual understanding when instruction was supported by visual tools such as concept maps and grammar rulers.

The implementation of thematic units—beginning with "Plants," and followed by "Animals"—allowed students to build foundational vocabulary and progress toward more complex sentence structures. In the first semester, students worked with bilingual concept maps, gradually transitioning in the second semester to creating separate, parallel maps in Ukrainian and English. This shift marked a clear developmental progression in their ability to organize information and express ideas independently in both languages.

Semi-structured interviews with classroom teachers underscored the value of this instructional model. Teachers reported noticeable improvements in students' metalinguistic awareness, particularly in their capacity

to compare grammatical and lexical features across Ukrainian and English. Additionally, educators highlighted enhanced retention of target vocabulary and greater fluency in constructing context-appropriate sentences, especially when supported by visual and metacognitive scaffolds.

Quantitative data analysis using Fisher's φ-criterion confirmed statistically significant gains ($p < 0.05$) in students' ability to produce bilingual sentences related to the themes studied. Students showed improved accuracy in identifying and classifying vocabulary items, as well as increased fluency and correctness in forming descriptive and comparative sentences.

Overall, the integration of metacognitive strategies within thematic instruction not only facilitated early bilingual literacy development, but also supported learners in building transferable skills in cross-linguistic reasoning, sentence structuring, and academic vocabulary use.

Integrating Bilingual Literacy through Thematic Instruction

At Interclass Bilingual Primary School, the topics of "Plants" and "Animals" are introduced to Grade 1 students through a structured bilingual approach. This series of lessons utilizes visual aids, interactive activities, and metacognitive tools to facilitate language acquisition and conceptual understanding. The instructional process is methodically sequenced to ensure the gradual integration of vocabulary and syntactic structures, thereby fostering bilingual literacy development.

A critical component of this instructional approach is the integration of a metacognitive schematic tool, commonly referred to as a "grammar ruler." This tool is employed throughout the entire learning process as an elementary symbolic system (pictogram) designed to support the construction of syntactic structures in a foreign language. Each graphic element represents a specific grammatical category: the diamond denotes an adjective, the oval signifies a noun (subject of the sentence), the arrow indicates the verb (predicate), the square corresponds to a noun (object), and the parallelogram represents an adverb (see Figure 1).

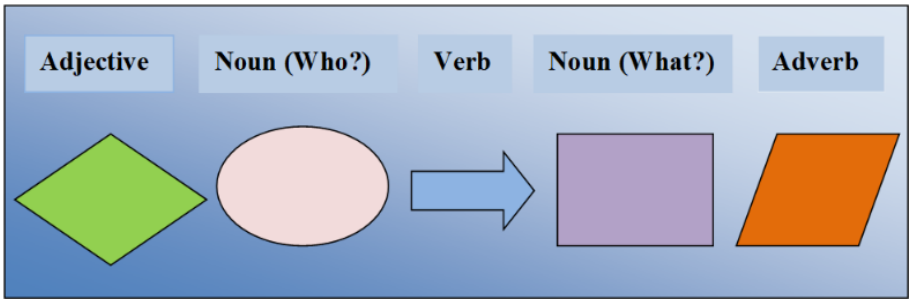

Figure 1. An example of an elementary "grammar ruler/line"—A scheme for logical-semantic structuring of sentences.

These visual representations facilitate the logical and semantic organization of sentence components, thus providing learners with a structured and accessible model for sentence formation. By integrating such visual grammar scaffolds consistently throughout the learning process, learners internalize fundamental syntactic patterns and enhance their ability to produce grammatically accurate and contextually appropriate utterances.

These metacognitive tools serve as a bridge between conceptual knowledge and linguistic production. The instructional sequence initiates with a taxonomic classification task, where students are required to categorize lexical items within a thematic field.

Using the topic "Plants" as a primary case study, students move beyond rote memorization to a structural understanding of botanical categories. The foundational activity requires learners to recognize the morphological

and functional diversity of flora, distinguishing among Herbs, Shrubs, and Trees. This process facilitates the reinforcement of cross-linguistic connections by associating each biological class with its visual representation and its corresponding "output"—such as vegetables derived from herbs or fruits harvested from trees.

Following the introduction of core vocabulary, learners utilize concept maps to explore and articulate specific plant characteristics, including structure (e.g., stem, trunk, or crown) and biological utility. These maps provide a logical-semantic model that enables students to construct comparative and descriptive sentences. Under this guided instruction, Grade 1 learners generate syntactic outputs, such as:

(a) *"A tree is tall and possesses a trunk."*

(b) *"A herb is small and characterized by a stem."*

(c) *"The birch is a tall, deciduous tree."*

(d) *"The apple tree provides sweet fruits."*

To foster simultaneous dual-language development, these instructional activities are conducted bilingually. This approach encourages students to analyze the parallel structures of Ukrainian and English, thereby enhancing their metalinguistic awareness. Examples of student-produced parallel structures include:

(a) *"Дерево високе і має стовбур."* (The tree is tall and has a trunk.)

(b) *"Морква—це корисний овоч."* (The carrot is a healthy vegetable.)

By utilizing comparative structures and the synchronized application of vocabulary, students broaden their expressive range and develop the cognitive flexibility necessary to navigate the complexities of artificial bilingualism. This systematic transition from bilingual concept maps to parallel, language-specific schemes (extending to the "Animals" unit) represents a significant developmental shift toward independent linguistic organization and conceptual alignment in both languages.

Then, students apply similar strategies to a new topic: "Animals." The "Animal Groups" unit represents the most complex stage of lexical and syntactic integration in the primary bilingual curriculum. Using a high-density visual concept map, students move from simple identification to a systemic understanding of biological classification, anatomical structures, and locomotion.

The instructional process begins with the categorization of fauna into distinct biological groups: Insects, Fish, Reptiles, Amphibious, Animals (Mammals), and Birds. This taxonomic approach encourages students to recognize universal patterns within diversity. Central to this unit is the "Body Parts" vertical axis, which serves as a physiological bridge for descriptive language. Students identify specialized features, such as:

(a) Wings for insects and birds;

(b) Fins and tails for fish;

(c) Scales for reptiles and webbed feet for amphibians;

(d) Hooves and paws for mammals.

Building upon the "grammar ruler" methodology, students integrate verbs of movement—fly, swim, jump, crawl, walk, run, and climb—to construct logic-semantic structures. The visual map facilitates the transition from naming an object to describing its functional capabilities. Using the established pictograms, Grade 1 learners generate complex, contextually appropriate utterances:

(a) *"A bird has wings and can fly."*

(b) *"A fish has fins and a tail; it can swim."*

(c) *"A horse has hooves and can run."*

(d) *"A frog has webbed feet and can jump."*

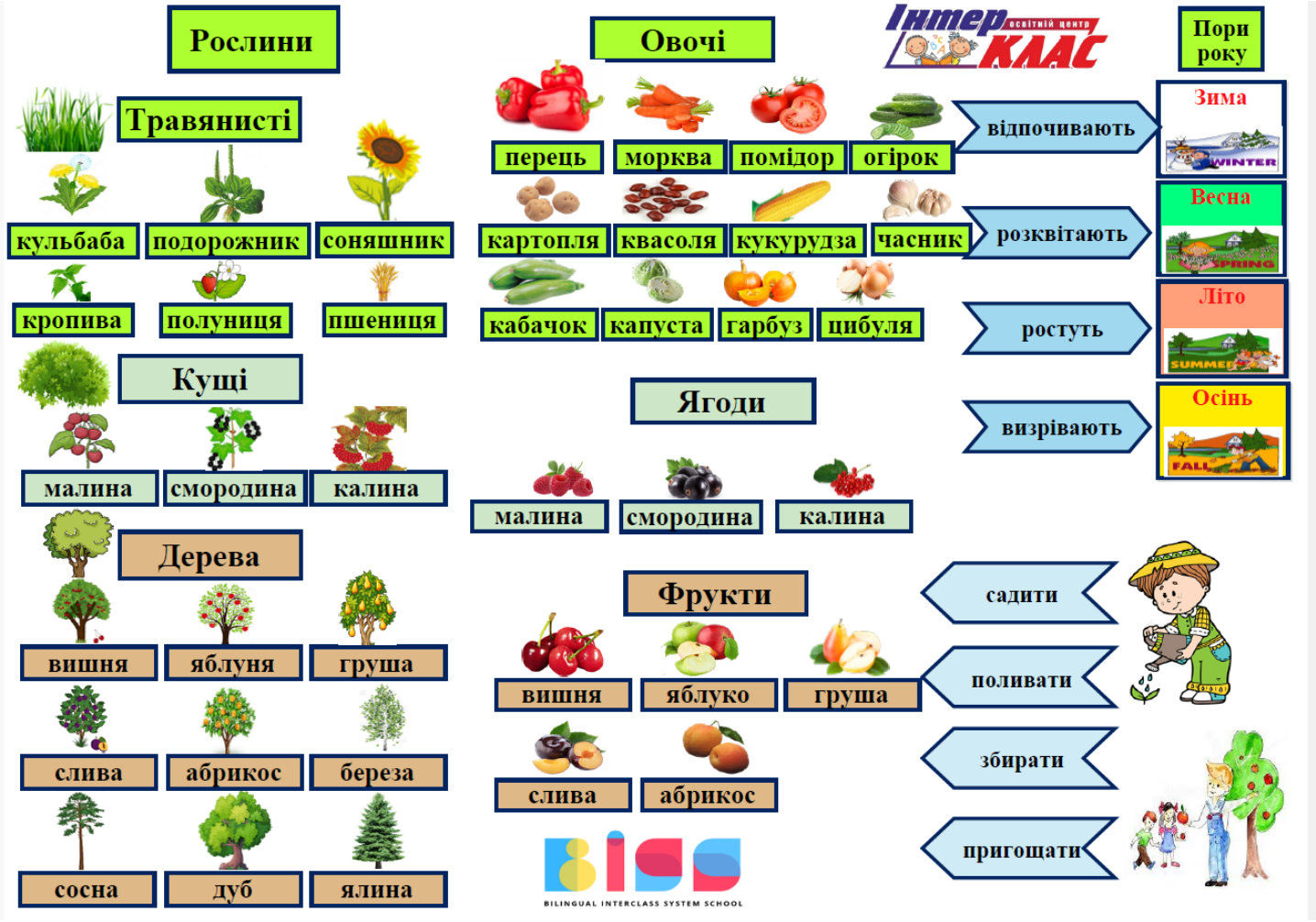

Figure 2. Concept map “Plants” in Ukrainian

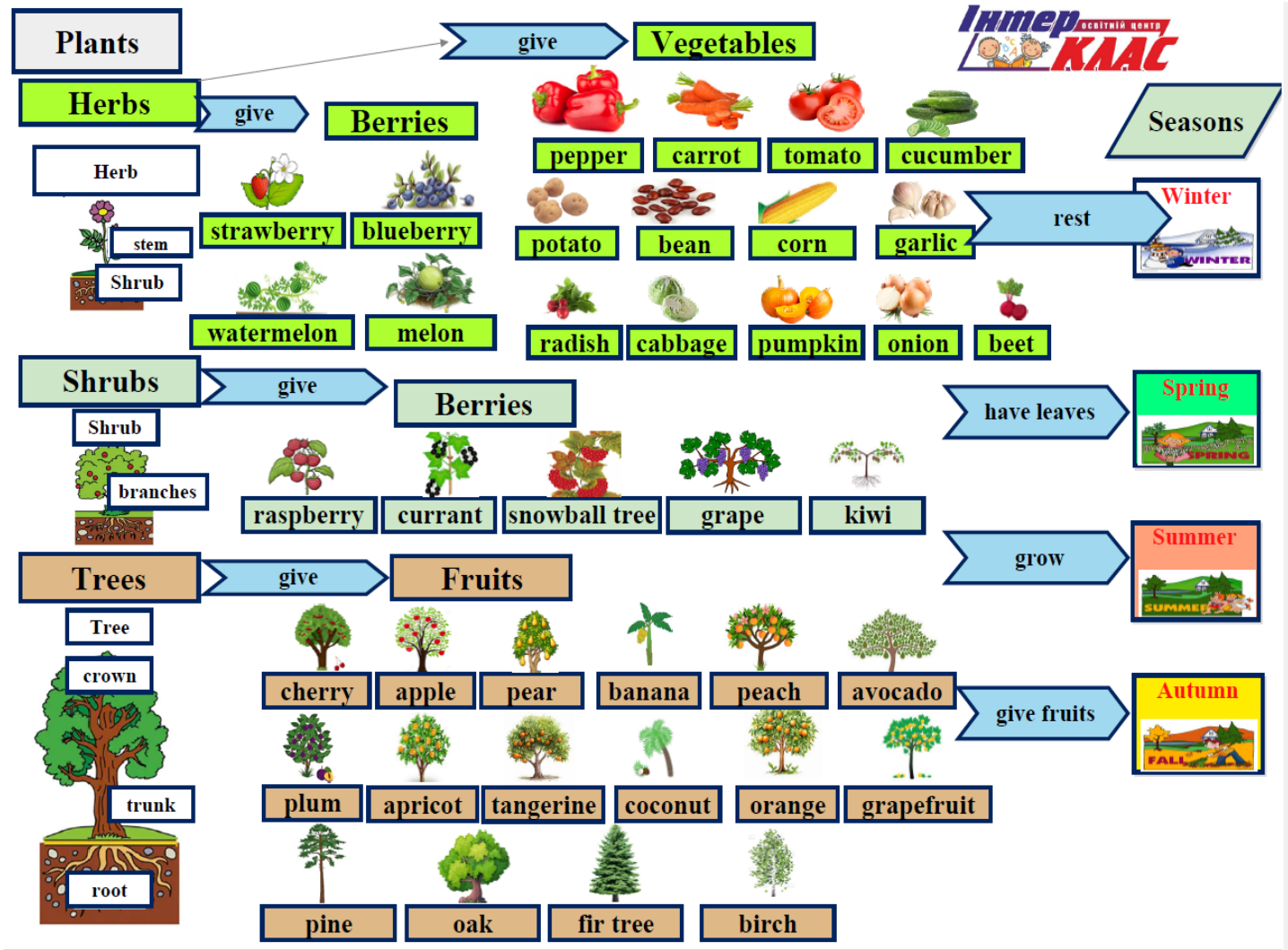

Figure 3. Concept map “Plants” in English.

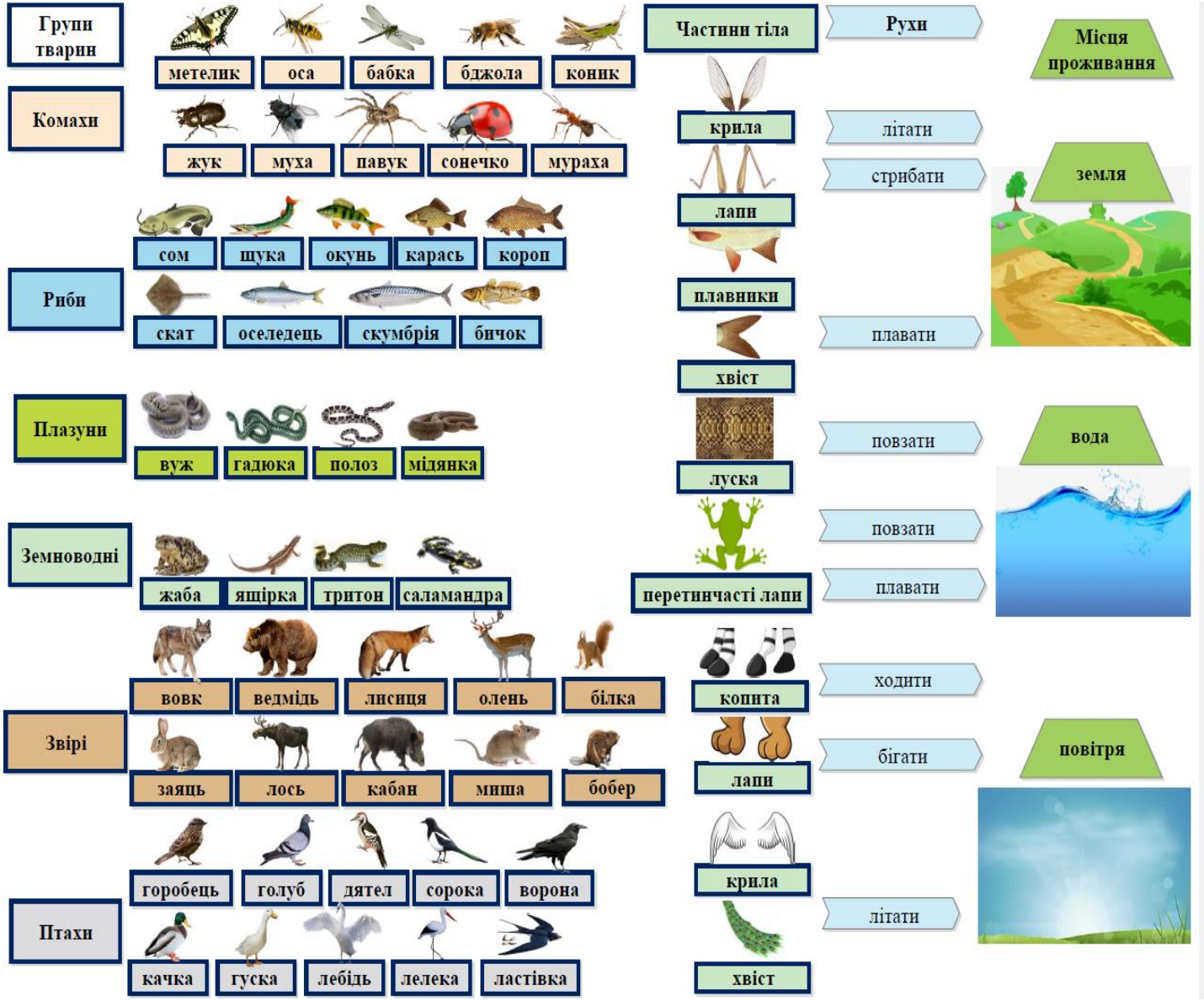

Figure 4. Metacognitive scheme “Animals” in Ukrainian.

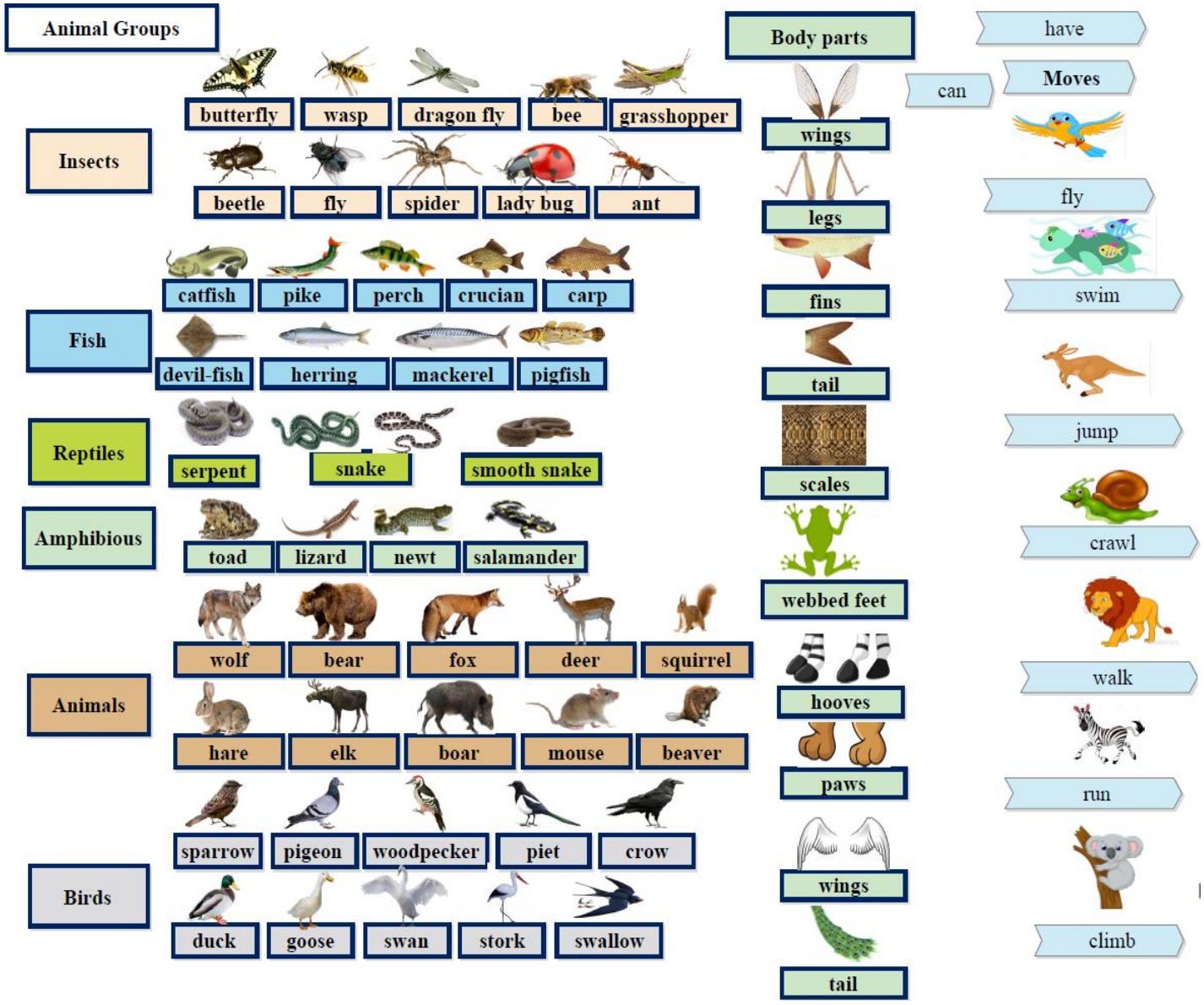

Figure 5. Metacognitive scheme “Animals” in English.

This unit specifically addresses the challenges of artificial bilingualism by providing a clear, parallel structure between English and Ukrainian. By mapping anatomical parts to specific actions (e.g., “paws” to “run” or “climb”), students develop a structured approach to sentence formation that transcends simple translation. This systematic integration of biological content, visual aids, and metacognitive strategies fosters a holistic bilingual literacy, allowing learners to navigate complex thematic fields with increasing cognitive flexibility and linguistic accuracy.

By engaging with the interconnected thematic fields of “Plants” and “Animals,” students develop a more expansive vocabulary base and demonstrate an improved capacity for the cross-contextual transfer of linguistic structures. The application of concept maps and visual grammar tools (pictograms) fosters cognitive flexibility, allowing learners to transition between Ukrainian and English with reduced cognitive load while establishing a robust foundational understanding of sentence architecture.

The iterative application of these metacognitive strategies enables learners to internalize a structured approach to sentence formation. This systematic integration of thematic instruction, visual scaffolding, and logical-semantic schemes enhances the students’ ability to construct grammatically precise and contextually appropriate utterances, effectively fostering bilingual literacy at the initial stages of primary education.

Statistical Analysis and Evaluation

Table 1 presents the statistical results reflecting students’ progress in bilingual sentence production, derived from the thematic units explored throughout the academic year. The data represents a comparative analysis of pre- and post-intervention performance, evaluated using Fisher’s ϕ-criterion.

Table 1

Comparative Results of Bilingual Competence Development

Criteria	Pre-intervention (1st semester)	Post-intervention (2nd semester)	*p*-value	Statistical significance
Students correctly classifying vocabulary	14 (46.7%)	27 (90.0%)	$p < 0.01$	Significant
Students constructing simple sentences	12 (40.0%)	26 (86.7%)	$p < 0.01$	Significant
Students using comparative adjectives	8 (26.7%)	24 (80.0%)	$p < 0.01$	Significant
Students completing bilingual concept maps	10 (33.3%)	25 (83.3%)	$p < 0.01$	Significant

Interpretation of Quantitative Data

The empirical data confirms the efficacy of the ILDA. The most significant gains were observed in sentence construction (increasing from 40.0% to 86.7%) and the functional use of comparative adjectives (rising from 26.7% to 80.0%). These metrics suggest that the transition from general thematic maps to specialized classifications—such as the anatomical and physiological mapping used in the “Animals” unit—directly supports the internalization of complex syntactic patterns.

Furthermore, the high success rate in completing bilingual concept maps (83.3%) underscores a burgeoning metalinguistic awareness, where students no longer view the foreign language as an isolated set of words, but as a parallel system for categorizing the natural world.

Interpretation of Statistical Results

The empirical data presented in Table 1 confirms the efficacy of the ILDA in fostering early bilingual competence. A comparative analysis of pre- and post-intervention performance reveals statistically significant improvements across all four pedagogical criteria ($p < 0.01$ according to Fisher’s ϕ-criterion).

Syntactic and Lexical Advancement

The most substantial gains were recorded in students' ability to construct simple sentences, which rose from 40.0% to 86.7%. This shift suggests that the "grammar ruler" and pictogram scaffolds successfully transitioned learners from passive vocabulary recognition to active linguistic production. Similarly, the functional use of comparative adjectives increased from 26.7% to 80.0%, indicating that the thematic classification of plants and animals—focusing on size, structure, and habitat—provided the necessary semantic depth for complex descriptions.

Cognitive Mapping and Metalinguistic Awareness

The ability to complete bilingual concept maps improved from 33.3% to 83.3%. This underscores a burgeoning metalinguistic awareness; students moved beyond literal translation to a systemic understanding of how English and Ukrainian categorize the natural world. By the second semester, the transition to parallel language-specific schemes—specifically within the "Plants" and "Animal Groups" units—demonstrated a significant developmental milestone. Learners began to organize ideas independently in each language while maintaining conceptual alignment, reflecting the "vital force" of the ILDA methodology in managing the complexities of artificial bilingualism.

Overall, the results support the conclusion that the structured integration of thematic content and metacognitive organizers significantly enhances early bilingual literacy. The increased fluency and structural accuracy in student output point to the potential for this approach to be scaled within similar bilingual educational contexts, particularly those navigating multiple home and school languages.

Discussion

The findings of this study confirm that the integration of bilingual literacy through structured thematic instruction significantly enhances the linguistic and cognitive development of young learners within contexts of artificial bilingualism. At the Interclass Bilingual Primary School in Kryvyi Rih, Ukraine—A unique sociolinguistic environment where students typically navigate Russian as a home language, Ukrainian as the primary language of schooling, and English as a foreign language—the structured systemic approach facilitated a more effective navigation of this complex multilingual landscape.

The instructional sequence on "Transport" served as the essential foundational unit for cross-linguistic development. By introducing vocabulary through visual concept maps and classification charts, students were guided to construct parallel semantic structures. During the initial semester, the use of combined bilingual concept maps provided the necessary scaffolding to strengthen the association between corresponding lexical items and basic syntactic patterns across languages.

As the curriculum progressed into the second semester, students applied these established strategies to the more biologically complex thematic fields of "Plants" and "Animals." The "Plants" unit, for instance, required students to categorize flora into herbs, shrubs, and trees, linking botanical structures like the stem or trunk to their respective linguistic labels in both English and Ukrainian.

A significant cognitive and linguistic milestone was observed during the transition from combined bilingual maps to separate, parallel concept maps in Ukrainian and English. This shift demonstrated the students' burgeoning ability to operate in a parallel bilingual mode—independently organizing ideas in each language while maintaining conceptual alignment. The "Animal Groups" unit further challenged students to map

anatomical parts (e.g., wings, fins, or paws) to specific functional capabilities (e.g., fly, swim, or run). This systemic mapping prevented the cognitive "tunneling" often associated with rote translation, fostering instead a deep-seated metalinguistic awareness.

The consistent application of the "grammar ruler" and other metacognitive pictograms played a crucial role in this progression. By providing a symbolic system to visualize sentence elements, these tools allowed learners to internalize fundamental syntactic patterns. The statistical data underscores this success, showing significant improvements in sentence construction (from 40.0% to 86.7%) and the accurate use of comparative adjectives (from 26.7% to 80.0%).

While initial challenges were noted—specifically regarding the students' unfamiliarity with visual knowledge organization—these were effectively mitigated through step-by-step instructional guidance. The consistent use of visual frameworks enabled learners to gradually assume ownership of the learning process.

In conclusion, this study underscores the pedagogical value of combining thematic instruction, visual scaffolding, and metacognitive strategies to support early bilingual literacy. Particularly in settings of artificial bilingualism, the ILDA offers a scalable and effective model for fostering linguistic competence and cognitive flexibility. These findings advocate for the broader implementation of ILDA-based practices in diverse multilingual classrooms to bridge the gap between abstract theory and practical communicative proficiency.

Structured Bilingual Instruction in Artificial Bilingual Contexts: Insights and Implications

The findings of this study provide compelling evidence that structured bilingual instruction is not only feasible but essential in artificial bilingual contexts—educational settings where students do not naturally acquire both languages at home. In such environments, the intentional integration of Ukrainian and English through thematic instruction allows learners to build balanced bilingual competence from an early age.

At Interclass Bilingual Primary School, students typically use Russian at home, are educated in Ukrainian, and learn English as a foreign language. This layered linguistic background creates both challenges and opportunities. Without deliberate instructional strategies, students may compartmentalize their language knowledge or fail to make cross-linguistic connections. The structured approach used in this study addressed this issue by promoting cognitive and linguistic alignment across languages.

The use of bilingual concept maps, thematic vocabulary sets, visual grammar tools, and scaffolded sentence-building tasks enabled learners to make connections between English and Ukrainian systematically. Themes served as cognitive anchors, offering contexts in which vocabulary and grammar could be introduced, compared, and practiced. Initially, students engaged with bilingual visual maps to support vocabulary recognition and category formation. As their bilingual competence grew, they progressed to creating language-specific maps while maintaining conceptual consistency across languages.

This progression—from simultaneous bilingual exposure to parallel bilingual processing—marks an important developmental shift. It reflects learners' growing capacity to manage and organize linguistic information independently within each language system, which is essential for long-term bilingual literacy development. The structured design of these activities encouraged students to think metalinguistically, compare sentence patterns, and apply newly acquired structures in both languages.

From a pedagogical perspective, this study underscores the importance of guided metacognitive and visual strategies in artificial bilingual settings. The findings suggest that bilingual education should not rely solely on language exposure but must include carefully designed tasks that integrate form, meaning, and context.

Furthermore, the use of tools like the "grammar ruler" allowed for consistent syntactic modeling across thematic units, supporting students' acquisition of sentence structures in meaningful ways.

In summary, structured bilingual instruction rooted in thematic, visual, and metacognitive strategies enables young learners in artificial bilingual settings to develop linguistic competence in both languages. The success observed in this study supports broader implementation of similar models in multilingual educational contexts, particularly those aiming to build functional bilingualism from the primary level.

Conclusions

This study highlights the effectiveness of integrating structured bilingual instruction and metacognitive tools into primary education within artificial bilingual contexts. By introducing thematic units, such as "Transport" and "Plants and Animals" through visual aids, bilingual concept maps, and symbolic grammar scaffolds, learners at Interclass Bilingual Primary School demonstrated measurable gains in language awareness, vocabulary retention, and sentence-building abilities in both Ukrainian and English.

The progression from bilingual recognition tasks to parallel concept mapping in two languages marked a significant cognitive milestone, reflecting students' development of independent language organization skills. The use of the "grammar ruler" as a symbolic syntactic guide further supported learners in constructing grammatically correct and contextually appropriate sentences, enhancing both fluency and accuracy.

Statistical evidence, reinforced by classroom observations and teacher interviews, confirms that such an approach fosters not only bilingual literacy but also cognitive flexibility. The consistent use of structured, thematic, and comparative strategies provided a foundation for meaningful cross-linguistic transfer, even in an environment where neither target language is dominant at home.

In conclusion, the implementation of visual-metacognitive frameworks within bilingual thematic instruction offers a promising pathway for fostering bilingual competence and academic literacy in early primary education. These findings support the continued development and dissemination of structured bilingual programs tailored to artificial bilingual settings.

References

Aquino-Sterling, C. R., & Nina Salcedo-Potter, N. (2019). Head Start educators' beliefs about bilingualism, dual language development, and bilingual education. *Bilingual Research Journal, 42*(3). 308-323. https://doi.org/10.1080/15235882.2019.1624282

August, D., & Shanahan, T. (2006). *Developing literacy in second-language learners: Report of the national literacy panel on language-minority children and youth*. Lawrence Erlbaum Associates.

Bialystok, E. (2018). Bilingual education and the development of metalinguistic awareness. *Annual Review of Applied Linguistics, 38*, 3-15.

Cahyati, S. S., Parmawati, A., & Atmawidjaja, N. S. (2019). Optimizing English teaching and learning process to young learners (A case study in Cimahi). *Journal of Educational Experts (JEE), 2*(2). 43-46. https://doi.org/10.30740/jee.v2i2p107-114

Cummins, J. (2000). *Language, power, and pedagogy: Bilingual children in the crossfire*. Multilingual Matters.

Cummins, J. (2007). Rethinking monolingual instructional strategies in multilingual classrooms. *Canadian Journal of Applied Linguistics, 10*(2), 221-240.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, *34*(10), 906-911. https://doi.org/10.1037/0003-066X.34.10.906

Frigolé, N., & Tresserras, E. (2023). Teaching English as a foreign language in multilingual milieus in Catalonia: perspectives and practices of educators in three state schools. *International Journal of Bilingual Education and Bilingualism, 26*(2), 230-243. https://doi.org/10.1080/13670050.2022.2114786

García, O., & Wei, L. (2014). *Translanguaging: Language, bilingualism, and education*. Palgrave Macmillan.

Garton, S., & Copland, F. (Eds.). (2019). *The routledge handbook of teaching English to young learners*. Routledge. https://doi.org/10.4324/9781315623672

Giguere, D., & Hoff, E. (2023). Bilingual children's vocabulary skills at 5 years predict reading comprehension development within, not across, languages. *International Journal of Bilingual Education and Bilingualism, 26* (2). https://doi.org/10.1080/13670050.2023.2166397

Gort, M., & Pontier, R. W. (2013). Exploring bilingual pedagogies in dual language preschool classrooms. *Language and Education, 27*(3), 223-245.

Marks, R. A., Sun, X., López, E. Mc A., Nickerson, N., & et al. (2022). Cross-linguistic differences in the associations between morphological awareness and reading in Spanish and English in young simultaneous bilinguals. *International Journal of Bilingual Education and Bilingualism, 25*(10), 3907-3923. https://doi.org/10.1080/13670050.2022.2090226

Nikolov, M., & Mihaljević D., J. (2011). *Early learning of modern foreign languages: Processes and outcomes*. Multilingual Matters.

Novak, J. D., & Cañas, A. J. (2008). The theory underlying concept maps and how to construct them. *Technical Report IHMC CmapTools*, 2006-01 Rev 01-2008.

Persici, V., Majorano, M., Bastianello, T., & Hoff, E. (2022). Vocabulary and reading speed in the majority language are affected by maternal language proficiency and language exposure at home: A study of language minority bilingual children in Italy. *International Journal of Bilingual Education and Bilingualism, 25*(10), 3729-3744. https://doi.org/10.1080/13670050.2022.2076552

Shymko, V. (2021). Discourseology of linguistic consciousness: Neural network modeling of some structural and semantic relationships. *Psycholinguistics, 29*(1), 193-207. https://doi.org/10.31470/2309-1797-2021-29-1-193-207

Tokareva, N. M. (2018). Genesis of the logico-semantic organization of adolescents speech in the post-nonclassical perspective of the contemporaneity. *Psycholinguistics, 24*(1), 343-359. https://doi.org/10.31470/2309-1797-2018-24-1-343-359

Tokareva, N., & Tsehelska, M. (2020). Metacognitive schemes as a tool for teaching English to young learners: Psychological discourse. *Revista Romaneasca pentru Educatie Multidimensionala, 12*(4), 53-71. https://doi.org/10.18662/rrem/12.4/333

Tokareva, N. (2022). Learning foreign languages. *Mendeley Data, V1*. https://doi.org/10.17632/2d7947vsjz.1

Tokareva, N. (2023). Trends in the detection of artificial bilingualism in the linguistic consciousness of an individual. *Mendeley Data, V1*. https://doi.org/10.17632/7bgswcgm28.1

Tsehelska, M. (2018). Effective strategies to enhance English language teaching in Ukraine. Naukovi zapiski. *Seriya: Filologichni nauki, Kropivnitskiy: «KOD»*, 165, 583-586. (in Ukrainian)

Yavorska, H. M. (2000). *Preskryptyvna linhvistyka yak dyskurs: Mova, kultura, vlada* (Prescriptive linguistics as a discourse: Language, culture, and power). Kyiv: NAN Ukrainy. In-t movoznavstva im. O.O. Potebni. 285 s. (in Ukrainian)

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Harvard: Harvard University Press.

Notes. Author contributions: Conceptualization, NT and MT; methodology, NT; software, NT; validation, NT and MT; formal analysis, NT; investigation, NT; resources, NT; data curation, NT; writing—original draft preparation, NT and MT; writing—review and editing, NT and MT; visualization, NT; supervision, MT; project administration, MT; funding acquisition, MT. All authors have read and agreed to the published version of the manuscript.
Institutional review board statement: The study "Integrating Bilingual Literacy through Thematic Instruction at Ukrainian-English Bilingual School" was approved by the Institutional Review Board of Educational Centre "Interclass" under the approval number ECI-2025-011.
Informed consent statement: Informed consent was obtained from all subjects involved in the study.
Conflict of interest: The authors declare no conflict of interest.