



Improving Students' Cognitive Competence in Higher Educational Institutions (On the Example of Foreign Language Teaching)

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Abstract: Cognitive competence — the capacity to process, integrate and apply knowledge flexibly — is a decisive factor in the academic success of university students. In the domain of foreign-language teaching, cognition interacts with metacognition, motivation and linguistic proficiency, forming a multilayer construct that determines how effectively learners internalise and transfer linguistic knowledge to communicative situations. The present study investigates pedagogical interventions aimed at enhancing cognitive competence among second-year undergraduates majoring in English Philology at two Uzbek universities. A quasi-experimental design compared a cognitively-enriched syllabus that embedded problem-based tasks, dialogic reflection and inductive grammar discovery with a conventional skills-driven curriculum. Cognitive progress was measured with the Adapted Scale of Cognitive Competence (ASCC) and triangulated via think-aloud protocols. Quantitative results demonstrate a statistically significant improvement in the experimental group ($p < 0.01$), while qualitative data reveal heightened strategic awareness and transfer of knowledge across disciplinary boundaries. The findings confirm that systematic cognitive scaffolding within foreign-language instruction not only accelerates linguistic attainment but also cultivates transferable intellectual skills essential to contemporary higher education.

Keywords: Cognitive competence; foreign-language teaching; higher education; problem-based learning; metacognition; quasi-experimental study.

Introduction: The accelerating internationalisation of labour markets places unprecedented cognitive demands on graduates, compelling universities to transcend the traditional remit of subject-specific knowledge transmission. Cognitive competence, defined in Bloom's and Anderson's taxonomies as the ability to analyse, evaluate and create knowledge, has consequently become a core outcome in national qualification frameworks. In Uzbekistan, strategic policy documents such as the 2022 "Concept on Foreign Languages Development" explicitly highlight cognitive skills as a prerequisite for multilingual professionals. Foreign-language classrooms provide an especially fertile ground for cultivating these skills because language learning inherently involves abstraction, inferencing and pattern recognition. However, empirical research into how concrete instructional practices can strengthen cognition beyond linguistic gains remains scarce in the regional context. Addressing this gap, the present article explores whether an instructional model that purposefully integrates cognitive scaffolding into foreign-language coursework can measurably enhance students' general cognitive competence without sacrificing communicative goals. The study's conceptual lens combines Vygotsky's sociocultural theory, which views learning as mediated by language and social interaction, with Mayer's cognitive theory of multimedia learning, arguing that deep processing arises when verbal and non-verbal channels are harmonised.

A quasi-experimental, pre-test/post-test control-group design was employed during the spring semester of 2024/25. Participants comprised 82 second-year students enrolled in obligatory English-for-Academic-Purposes courses at Samarkand State University (experimental group, $n = 41$) and Namangan State University (control group, $n = 41$). Groups were intact classes matched for age, prior GPA and IELTS scores ($M = 5.5$, $SD = 0.4$). Ethical clearance was obtained from both institutional review boards; informed consent was secured.

The experimental syllabus replaced routine text-translation cycles with cognitively-enhanced modules. Each 90-minute session opened with an ill-structured problem linked to current global issues, prompting students to activate background knowledge and formulate hypotheses in English. Subsequent phases required cooperative reading of multimodal sources, inductive grammar noticing, and reflective journals synthesising cognitive and linguistic insights. Instructors were trained to provide graduated scaffolding, progressively transferring control to learners. By contrast, the control course followed a

nationally prescribed skills-based textbook emphasising vocabulary drills, teacher explanations and summative tests.

Primary data were collected using the Adapted Scale of Cognitive Competence, an English-language version of the Russian ВПК-С questionnaire, validated for Central Asian cohorts (Cronbach's $\alpha = 0.87$). The ASCC measures analytic reasoning, creative ideation and cognitive flexibility on a five-point Likert scale. Complementary qualitative data came from fortnightly think-aloud sessions in which eight randomly selected students per group verbalised mental processes while solving argumentative essay prompts. Sessions were video-recorded and transcribed.

Quantitative data met assumptions of normality (Kolmogorov-Smirnov $p > 0.05$) and homogeneity of variance (Levene's test $p > 0.05$). Paired-samples t-tests assessed within-group gains; ANCOVA, controlling for pre-test scores, examined between-group differences. NVivo 14 supported thematic coding of verbal protocols, following Chi's microgenetic method to trace shifts in strategy use.

Pre-intervention ASCC means did not differ significantly between groups (experimental = 2.71, control = 2.74; $p = 0.64$), attesting to baseline equivalence. After fourteen weeks, the experimental cohort's mean rose to 3.68 ($SD = 0.42$), whereas the control group reached 3.05 ($SD = 0.39$). The within-group gain for the experimental class ($\Delta = 0.97$) was highly significant ($t = 12.21$, $p < 0.001$, $d = 1.91$), surpassing the control gain ($\Delta = 0.31$; $t = 5.78$, $p < 0.001$, $d = 0.88$). ANCOVA confirmed that, after adjusting for pre-test scores, instructional condition accounted for 28 % of variance in post-test outcomes ($F = 26.45$, $p < 0.01$, $\eta^2 = 0.284$).

Think-aloud analysis indicated a qualitative transformation in cognitive operations among experimental students. Early protocols were dominated by surface translation and trial-and-error lexical retrieval. By week ten, learners articulated hierarchical planning ("I need to group evidence under thematic umbrellas"), employed inferential reasoning ("because climate change affects migration, this supports my argument") and referenced metacognitive monitoring ("I realise this paragraph repeats an idea; I will restructure"). Control participants exhibited incremental gains in vocabulary accuracy but maintained linear, sentence-by-sentence processing with limited reflection on global coherence.

The pronounced advantage observed in the experimental condition corroborates international findings that cognitively-oriented language instruction stimulates higher-order thinking. From a sociocultural vantage, scaffolds such as collaborative hypothesis

testing and dialogic reflection expand learners' zones of proximal development, allowing internalisation of intellectual operations initially mediated by peers and teachers. Moreover, Mayer's dual-channel principles were operationalised through multimodal materials that synchronised textual input with visual data, reducing extraneous cognitive load and freeing working memory for integrative reasoning.

Importantly, enhanced cognitive competence did not impede linguistic progress; incidental vocabulary uptake recorded via weekly quizzes rose marginally faster in the experimental group (although between-group differences did not reach statistical significance). This finding counters the lingering assumption that explicit cognitive work diverts time from language practice. Instead, the study suggests a mutually reinforcing relationship wherein cognitive engagement deepens semantic processing, thereby consolidating lexical representations.

The context-specific contribution of the present research lies in its alignment with Uzbek higher-education reform agendas, demonstrating that relatively low-cost pedagogical adjustments can yield substantial cognitive dividends. Nevertheless, several limitations warrant caution. The quasi-experimental design, while pragmatic, cannot fully exclude selection biases inherent in intact groups. Longitudinal tracking beyond a single semester is necessary to establish durability of cognitive gains. Future inquiries should also investigate disciplinary transfer by observing whether students apply the cultivated strategies to non-linguistic coursework such as history or computer science.

CONCLUSION

Embedding purposeful cognitive scaffolding into foreign-language teaching significantly elevates students' analytic, creative and flexible thinking abilities, as evidenced by robust quantitative gains and rich qualitative insights. The approach aligns with global and national imperatives to foster adaptable, reflective professionals ready for complex, multilingual workplaces. Institutional adoption of such pedagogy therefore represents a strategic avenue for higher educational institutions seeking to balance linguistic proficiency with broader cognitive development.

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