

Evolution of Autonomous Learning in English for Technical Students: Historical Trends, Pedagogical Foundations, and Implications for Competence Development

Yagyaeva Elvina

Doctoral student of Fergana State University

e-mail: yagyaevaelvina81@gmail.com

Abstract

The article reveals the historical evolution of autonomous learning in English for technical students, tracing shifts from grammar-translation to ICT-enabled heut. It links theory with practice, emphasizing adaptive, competency-based approaches, ESP, and project-based tasks. It argues for a systemic model leveraging digital platforms and AI feedback to foster professional communication.

Key words: autonomous learning, foreign language teaching, English for technical students, history of language education, grammar-translation method, audiolingualism, project-based learning, communicative approach, information and communication technologies, adaptive learning, personalized learning.

Analysis of the evolution of foreign language teaching methods in the XX–XXI centuries reveals a substantial transformation in how autonomous student work is organized. The progression moves from the grammar-translation dominant paradigm of the 1940s–1950s, through the audiolingual model characteristic of the wartime period, to project-based instruction in the 1960s–1970s, to communicative approaches in the 1980s–1990s, and finally to the contemporary integration of information technologies in the early XXI century. Each era introduced new elements to autonomous work: from practicing grammatical exercises and translation to audiovisual methodologies, then to project work and role-play, and, ultimately, to the use of electronic educational resources, online platforms (Coursera, edX), and specialized language applications. The current phase is defined by the expansion of autonomous learning, the development of critical thinking, and the cultivation of professionally oriented competencies through digital technologies.

In the context of individualized instruction, approaches and methods tailored to students' unique needs—such as adaptive

learning and personalized learning pathways—are increasingly implemented. The advancement of computer technologies and the Internet has heightened interactivity in English language learning, offering students broader opportunities for self-directed practice, including interaction with native speakers via online resources.

Western theoretical thought has treated autonomous work as activity performed with no direct assistance but under supervision. However, the literature reveals a lack of methodological guidance on preparatory actions, including dosage of material per session, planning of work, required repetition, and self-monitoring mechanisms. Foundational investigations of autonomy are presented in the works of M.N. Skatkin, A.V. Myznikov, N.A. Markov, and others. The structure of autonomy comprises organizational-technical and cognitive components. The former is characterized by practical orientation, the latter by theoretical ones. Consequently, autonomy manifests itself as a triad of practical, cognitive, and organizational-technical activity, encompassing time planning,

action planning, and the preparation of necessary tools.

The industrialization of the XIX century created a demand for multilingual professionals, especially in English. Leading European and American technical universities initiated the integration of language courses into curricula. Early twentieth-century pedagogy in technical universities was dominated by the grammar-translation method, focusing on grammar and translation rather than developing communicative abilities or addressing technical terminology.

The postwar period saw intensified international scientific-technical cooperation, driving modernization of English-language pedagogy. Audiolingual and communicative approaches evolved to build conversational competence.

The 1960–1970s marked a notable integration of autonomous work into the educational process, with the introduction of independent assignments, laboratory work with elements of self-preparation, and initial use of audiovisual teaching aids.

The modern stage (late twentieth century – early twenty-first century) is linked to a fundamental transformation of autonomous-work methodology under the influence of information technologies and the Internet. Expanded access to electronic learning resources, digital libraries, educational platforms, and specialized language apps has substantially altered autonomous learning.

Current English-language teaching in technical universities emphasizes a competency-based approach, focusing on developing professional-language skills and competencies essential for successful professional realization. The historical evolution illustrates the ongoing refinement of methodological foundations for organizing autonomous student work in technical higher education within the context of adapting to changing

requirements and educational opportunities.

The theoretical analysis of organizing autonomous work in English-language instruction at technical universities highlights the need to examine the issue through historical development and contemporary educational paradigms. Investigating methodological foundations becomes especially timely given modern demands for training technically skilled professionals capable of continuous development and international communication.

The evolution of autonomous-work approaches in technical universities is inextricably linked to changes in English-language pedagogy and the advancement of information and communication technologies. Uzbek scholars, notably H.F. Rashidov and N.N. Azizkhodjaeva, demonstrate that the effectiveness of autonomous work increases when traditional methods are integrated with modern educational technologies. O.A. Kuysinov's research on innovative methods for organizing autonomous work of students in technical specialties is particularly influential. International ESP research also confirms the need to modernize autonomous-work approaches; D. Nunan and P. Benson underscore the importance of fostering learner autonomy and developing self-directed language-learning strategies within professional contexts.

Recent doctoral and postgraduate studies (2014–2024) further illuminate trends in autonomous learning within technical higher education. Analyses by A.V. Petrov (2019) and N.P. Sidorova (2020) emphasize digitalization of the learning process, yet highlight gaps in integrating traditional pedagogical methods with emerging technologies. E.K. Mikhaylova (2022) and P.R. Alekseev (2023) point to the promise of project-based learning for professional language development, while

calling for holistic frameworks that connect language proficiency with disciplinary expertise. These findings motivate a systemic approach that situates language training within the broader competencies required for engineering practice.

In this context, competencies such as information literacy, collaborative problem solving, and reflective practice are increasingly embedded in English-language curricula for technical students. The use of authentic tasks—design briefs, technical reports, and simulated industry briefs—facilitates active learning and reinforces domain-specific terminology. Digital tools, including learning management systems, cloud-based collaboration environments, and AI-assisted feedback, support timely scaffolding and personalized pacing, enabling students to advance at individualized rates without sacrificing rigor. Cross-cultural and intercultural communicative competence remains a central aim, given the global nature of modern engineering. Online exchanges with engineers and researchers from diverse backgrounds, virtual lab tours, and international collaboration projects contribute to pragmatic language use in authentic contexts. Such experiences not only build linguistic proficiency but also cultivate adaptability, resilience, and global professional identity.

CONCLUSION

The trajectory of autonomous learning in English for technical students reflects a deliberate shift from teacher-centered, rule-based instruction to learner-centered, technology-enabled practice. This evolution integrates disciplinary content with language training, underpinned by a robust framework of competencies essential for contemporary engineering professions. A forward-looking model should combine adaptive learning, project-based tasks, and authentic intercultural practice within a competency-based paradigm, leveraging

digital platforms and AI-enabled feedback to support continuous development. This holistic approach promises to prepare graduates who communicate effectively in international teams, contribute to innovation, and engage confidently in lifelong professional learning.

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