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On the Teaching of Specialized Subjects to International Students in Engineering Education in Azerbaijan

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In the 21st century, globalization has become a defining force shaping the dynamics of higher education worldwide. One of the most prominent manifestations of this global transformation is the increasing adoption of English Medium Instruction (EMI**)** in non-English speaking countries. EMI refers to the use of English as the language of instruction for academic subjects, particularly in higher education institutions where English is not the primary language. As nations strive to internationalize their educational systems, EMI programs are being introduced not only to attract international students but also to enhance the global competitiveness of domestic graduates. According to Mammadova (2023), the global shift toward EMI

reflects a broader effort by universities to align their curricula with international academic and labor market standards.

Azerbaijan, situated at the crossroads of East and West, has actively participated in this global trend. Over the past decade, the Azerbaijani higher education system has undergone significant reform aimed at modernization, international collaboration, and alignment with global standards. One of the key elements of this transformation has been the implementation of EMI programs, particularly in technical and engineering disciplines. The choice of engineering is not coincidental; this field is central to national development, industrial innovation, and participation in global technological advancements. As such, the ability to deliver engineering education in English is seen as a strategic priority for both institutional growth and national progress.

The number of international students enrolling in Azerbaijani universities—particularly in engineering programs—has been steadily increasing. This demographic shift has placed new demands on the academic infrastructure, requiring not only English-language instruction but also appropriate pedagogical and administrative support systems. The presence of foreign students introduces new dimensions to the teaching and learning process, including language diversity, cultural adaptation, and differentiated academic needs. These changes necessitate a comprehensive review of how specialized engineering subjects are taught to non-native speakers of English.

Moreover, the implementation of EMI in engineering education goes beyond simple language substitution. It involves a systematic transformation of curriculum design, teaching methodology, faculty training, student assessment, and support services. The goal is to ensure that students – regardless of their native language – an access, understand, and apply complex technical knowledge in English, while developing competencies that will enable them to thrive in international academic and professional environments.

EMI Policy and Its Application in the Azerbaijani Education System

With the acceleration of globalization in education worldwide, English-medium instruction programs are expanding and have become relevant for Azerbaijan as well. English-medium education is particularly essential for training engineering professionals in line with international standards. Azerbaijani higher education institutions have adopted EMI policies to respond to the influx of international students and the demands of the labor market (Mammadova, 2023). This policy creates the conditions for training highly qualified and competitive engineering specialists in the country.

The integration of EMI into the Azerbaijani education system is considered a state-level priority. EMI programs are not merely about language; they also aim to enhance the quality of education, align with international standards, and prepare students for integration into the global labor market. According to Mammadova (2023), the primary goal is the internationalization of the national education system and the attraction of foreign students. However, implementing EMI policies faces several challenges.

Firstly, there is a need to improve the training and professional development of teaching staff. Many instructors face difficulties teaching in English, which may negatively affect the quality of instruction. Therefore, training programs must be organized to enhance both language proficiency and pedagogical skills.

Secondly, the adaptation of teaching materials into English and the renewal of curricula are necessary. Since most engineering content is currently available in Azerbaijani or Russian, translating materials and developing new teaching resources is essential. Although this process is time- and resource-consuming, it is vital for effectiveness.

Thirdly, students' English language proficiency levels vary. While language preparatory courses are offered at universities, their quality is sometimes insufficient. Language training should be strengthened both theoretically and practically.

Fourthly, the social and cultural environment is also critical. To facilitate the adaptation of international students, universities should provide multicultural

environments, counseling services, and academic support, all of which increase student motivation.

Azerbaijani universities are attempting to align EMI policies with international accreditation standards, which in turn expands students' educational and employment opportunities abroad. Through EMI programs, students are exposed to global innovations and can participate in international research.

The expansion of EMI programs in engineering has a direct impact on the country's economic and social development. Highly qualified engineers are fundamental to innovation and technological progress. Therefore, the quality of EMI programs requires particular attention.

In conclusion, the implementation of EMI in Azerbaijani higher education contributes to the internationalization of the education system, increases the number of international students, and enhances the quality of engineering personnel. Key factors in this process include language preparation, curriculum adaptation, professional development of instructors, and social support for students.

Language and Technological Preparation of International Students

The success of international students in EMI programs depends primarily on their language preparation and their adaptation to modern teaching technologies. In Azerbaijan, integrating international students into the education system involves not only English proficiency but also the ability to adapt to new instructional environments and technologies. One of the major challenges is the students' level of English, which is essential for understanding engineering subjects and engaging in academic activities. Aliyev (2017) notes that while Azerbaijani students are prepared for Web 2.0 technologies, the English proficiency levels of international students can vary significantly. Weakness in technical and professional language skills creates additional difficulties.

As a response, many universities offer courses in professional and technical English, though their effectiveness depends on students' varying levels. Instructional programs must focus on both theoretical and practical skills.

Technology plays a key role in modern education. Aliyev (2017) emphasizes that Web 2.0 platforms, social media, and interactive tools increase student engagement. Azerbaijani universities use platforms such as Moodle, Zoom, and Microsoft Teams, which are beneficial in teaching both English and engineering subjects. Online laboratories, simulations, and video lectures enhance students' knowledge and strengthen practical skills.

New teaching strategies, including student-centered and active learning methods, support the success of international students. Collaboration between language and subject instructors is encouraged so that technical terminology is taught in both language and subject classes.

Social adaptation is also crucial. Universities organize mentorship programs, student support services, and multicultural events to facilitate the integration of international students into the social environment. Barriers such as limited financial resources, adaptation to technology, and challenges posed by the COVID-19 pandemic still exist. However, measures are being taken at both governmental and institutional levels to address these issues.

In the future, innovative pedagogical approaches, personalized learning plans, and technologies such as virtual reality may be introduced. Therefore, improving language skills and integrating technology into instruction is vital for the success of international students in EMI programs.

Instructors' Perspectives and Experience in EMI Programs

Instructors' attitudes and experiences in EMI programs are critical to the quality of education. Research conducted in Turkey (Ekoç, Özçelik, Kavanoz, & Yılmaz, 2025) demonstrates that instructors in EMI settings often face challenges related to language barriers, adaptation of teaching materials, use of technical terminology, and pedagogical methods. Similar issues exist in Azerbaijan, where there is a need for professional development programs for instructors.

Instructors' perspectives on EMI vary: while some embrace the benefits of alignment with international standards and enhanced competitiveness, others struggle

with language proficiency and terminology. In many cases, instructors may not be fully proficient in English, which affects both their own and their students' motivation. For this reason, regular training programs to improve language and pedagogical competencies are essential.

Instructors' experience also shapes their pedagogical approaches. Experienced educators tend to use methods tailored to students' language levels, including visual materials, group work, and interactive techniques. Newer instructors may rely more on traditional methods, underscoring the importance of mentorship and peer support.

The integration of technology helps facilitate instruction and makes classes more engaging. Although the full potential of educational technologies is not yet fully utilized in Azerbaijan, training programs are being conducted to enhance digital literacy among instructors.

Instructor motivation is also a key factor. Providing opportunities for professional growth, certification programs, and participation in international conferences helps increase motivation. Ultimately, instructors' perspectives and experiences are essential to the success of EMI programs. Professional development, technology integration, and motivation systems are critical in training engineering personnel in Azerbaijan.

Conclusion and Recommendations

Evaluation of EMI programs is vital to ensure their effectiveness and sustainable development. In Azerbaijan, EMI program assessments focus on both the instructional process and learning outcomes. Evaluation methods include exams, student feedback, instructor self-assessment, and accreditation processes. Based on this data, shortcomings are identified and addressed.

To enhance compliance with international standards, Azerbaijani universities utilize feedback from foreign experts and follow the recommendations of international accreditation agencies. This improves program quality and supports international recognition of students' qualifications.

Key directions for the future development of EMI programs include:

- Enhancing language and pedagogical training for both instructors and students;
- Continuous renewal of instructional materials and broader use of educational technologies;
- Expanding student-centered and interactive teaching methods;
- Strengthening systems of social and cultural support;
- Fostering international cooperation and experience exchange.

The role of EMI programs in Azerbaijan's education policy will continue to grow. This is a strategic step toward enhancing the country's global competitiveness and training highly qualified engineers. Cooperation between the state, universities, and instructors is essential for the continuous development of these programs.

Overall, EMI programs have a positive impact on students, instructors, and the country's socio-economic development, and improving their quality should remain a top priority.

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