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INCLUSIVE FOREIGN LANGUAGE TEACHING IN MULTILINGUAL TECHNICAL UNIVERSITIES

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Abstract. Kazakhstan's current language policy, based on the principle of trilingualism, requires new approaches to improving the quality of training for engineering students. In these conditions, the introduction of bilingual and inclusive practices becomes relevant, but their impact on the academic performance of future engineers has not been sufficiently studied. The study aimed to evaluate the effectiveness of the bilingual academic model (BAM) as a tool for developing foreign language competence and increasing the academic motivation of students at a technical university. The study involved 124 students of the Abylkas Saginov Karaganda Technical University (2023–2024). The Oxford Placement Test, statistical processing methods (t-test, ANOVA, χ^2), as well as analysis of digital activity in Moodle and Microsoft Teams, were used. Qualitative data were obtained through semi-structured interviews, which were analysed using thematic coding. In the experimental group studying BAM, there was a significant increase in the proportion of students reaching level B2, from 12% to 29% (t-test, $p < 0.05$). The largest increase (17%) was observed among students who regularly worked on digital platforms (ANOVA, $p < 0.01$). Interviews showed that code-switching performed a cognitive function, facilitating the acquisition of engineering terminology. The study demonstrates the effectiveness of BAM as a model that integrates multilingualism, digitalisation, and inclusive practices in engineering education. In the future, its application could be expanded by combining it with CLIL and blended learning. However, the study has limitations: it covers only one university and does not consider the socio-economic background of the students. Further research should include broader contingent and long-term monitoring to confirm the sustainability of the identified effects.

Keywords: inclusive education, foreign language teaching, technical university, bilingualism, multilingual environment, Kazakhstan, engineering education, digital educational technologies

Introduction

Inclusive education in foreign language teaching at technical universities is increasingly being considered in international research as a necessary condition

for academic and professional success for students (OECD, 2023; UNESCO, 2022) [1]. In most cases, attention is focused either on adapting methodologies in the monolingual educational environment of Europe or on creating programmes to support students with special needs at universities in the United States and Asia [2]. However, in Central Asian countries, where multilingualism is an institutionalised norm, such issues remain understudied [3].

Contemporary approaches to educational environment design emphasise the need to combine language training with subject-specific instruction and digital formats. Thus, the blended learning and flipped classroom models (Horn & Staker, 2014; Bergmann & Sams, 2021) are seen to increase academic flexibility and student engagement.

Kazakhstan is a unique example: state bilingualism (Kazakh and Russian) is combined with the growing role of English as the language of science, technology, and global communication. In these conditions, foreign language teaching at a technical university must consider not only academic but also socio-cultural factors [4] that affect student success. Research on digital pedagogy (Sharma & Hannafin, 2007; Anderson & Krathwohl, 2023) emphasises the role of technology in creating inclusive conditions that ensure the individualisation of educational trajectories and support for students with different levels of language proficiency. However, inclusion practices in engineering and technical education in Kazakhstan remain insufficiently described in the scientific literature, which defines the research gap [5].

The CLIL (Content and Language Integrated Learning) approach is widely used in international practice, allowing the integration of foreign language learning into professional disciplines (Coyle, Hood & Marsh, 2010). However, such models have not yet become widespread in engineering education in Kazakhstan, which reinforces the relevance of this study [6].

This study aims to identify and analyse inclusive foreign language teaching practices at a technical university in Kazakhstan, considering the bilingual and multilingual educational environment. This research approaches inclusion as an embedded structural parameter of the educational environment, treating it as a factor that actively reorganizes learning conditions and, as a result, reshapes the academic progression and professional formation of future engineers.

Thus, the article serves as a basis for broader discussions on how the adoption of inclusive practices in a multilingual context can strengthen the training of engineering specialists and be applied in other countries with similar educational conditions.

Materials and methods

The study was designed as a quasi-experimental comparative investigation with control and experimental groups conducted in a natural educational setting

during the 2023–2024 academic year at a technical university in Kazakhstan. To ensure methodological validity and scientific rigor, a combination of theoretical and empirical research methods was employed. Theoretical methods included analysis and synthesis of domestic and international scholarly literature on bilingual education, inclusive pedagogy, multilingualism, and digital learning environments, as well as comparative analysis of established instructional models. Empirical methods comprised diagnostic testing, systematic pedagogical observation, questionnaire survey, semi-structured interviews, and digital learning analytics. Quantitative statistical methods included descriptive statistics, independent-samples t-test, one-way analysis of variance (ANOVA), chi-square (χ^2) test, and correlation analysis. Qualitative methods involved thematic coding, content analysis, and elements of social network analysis [11]. The selection of these methods was determined by the need to obtain statistically reliable quantitative indicators while simultaneously capturing in-depth qualitative insights into bilingual instructional processes in a multilingual engineering context.

The study covered 124 students majoring in Information Systems, Geology, Architecture, and Construction. The sample deliberately included different engineering specialities, which made it possible to track not only the dynamics of language training [7], but also the specifics of professional discourse depending on the profile. The sample size (124 students) was calculated considering the total number of students in the faculty (~600 students) and ensures statistical reliability at a significance level of 95% and a confidence interval of ±5%. This sample size allows us to speak of the representativeness of the data for analysing the dynamics of language training for students of engineering and technical profiles. In addition, 12 teachers from the Department of Foreign Languages with experience working in bilingual and multilingual environments participated in the study.

A key feature of the context was that the study was conducted under the conditions of Kazakhstan's language policy, which is oriented towards the trinity of languages — Kazakh, Russian, and English [8]. Unlike most international studies, which compare one national language with English, multilingualism is the norm rather than the exception in Kazakhstan. This circumstance required researchers not only to assess students' English proficiency but also to analyse students' interactions at the intersection of three languages.

The online version of the Oxford Placement Test was used to determine the initial level. It allowed students to be divided into CEFR levels from A1 to B2. The testing took place in computer classrooms under the supervision of teachers, which ruled out the possibility of external interference. This tool was chosen because of its international recognition and the ability to compare the data obtained with the results of foreign studies.

In addition to testing, digital data on student activity on educational platforms was collected. Moodle system logs (frequency of logins, session duration, task completion) and Microsoft Teams data (participation in video sessions, use of microphone and camera, chat messages) were analysed [9]. In this way, not only were academic achievements recorded, but also the level of actual involvement in the learning process. A separate block involved the structured use of digital applications: Quizlet was used to reinforce engineering terminology, Kahoot! was used for formative assessment, and Padlet was used for project work and group interaction [10]. These tools were hardly used in the control group, whereas in the experimental group they were integrated into each course topic, which made it possible to track the difference in results.

An important source of data was the systematic observation of code-switching. Teachers recorded such cases in their logs, noting the situation, the language to which the switch occurred, and its function — explanation, clarification of a term, emotional reaction, or support for less confident students. This made it possible to view bilingualism not as a barrier, but as a structured learning resource facilitating cognitive processing within multilingual instruction.

In addition, a questionnaire (25 questions) and a series of semi-structured interviews were conducted. The questionnaire included three sections: perception of digital technologies, difficulties of learning in a multilingual environment, and attitudes towards inclusive practices. The qualitative data from the interviews were analysed using thematic coding. Student responses were first broken down into meaningful analytic units through detailed interpretative reading. These units were then reorganized and conceptually linked to identify recurring patterns, which were consolidated into broader thematic configurations related to digital technologies, multilingual learning contexts, and inclusive educational approaches. To increase the reliability of the analysis, two independent researchers coded the texts, after which the agreement coefficient (Cohen's kappa) was 0.82, confirming high inter-subject agreement. Interviews were conducted individually and in mini groups, with students able to choose the language of communication (Kazakh, Russian, or English). This approach ensured greater candour in the responses and allowed identification of difficulties not always reflected in formalised tests.

Data analysis was carried out at two levels. The quantitative stage included processing test results and digital statistics, as well as correlation analysis to identify relationships between student activity and their progress. To test the statistical significance of the differences, an independent-samples t-test was used to compare the control and experimental groups, one-way ANOVA was applied to identify differences between training areas, and the χ^2 criterion was used to analyse distributions by CEFR levels. All reported changes in the

experimental group reached statistical significance at $p < 0.05$. The qualitative analysis was based on content analysis of questionnaires and interviews, as well as elements of social network analysis [11]. Interaction maps were constructed within project groups, enabling the identification of students who acted as mediators between strong and weak participants.

Thus, the methodology combined internationally recognised assessment tools (Oxford Placement Test), digital analytics (Moodle, Teams), pedagogical observation, and qualitative research procedures (questionnaires, interviews, interaction analysis). The novelty lies in the integrated application of these scientific methods to the context of engineering education in Kazakhstan under conditions of sustained bilingualism and institutionalised trilingualism. This design made it possible not only to record the dynamics of language results, but also to describe the mechanisms for including students with different levels of preparation in the general educational environment.

The research protocol underwent institutional ethical review at Abylkas Saginov Karaganda Technical University before data collection commenced. Participants were briefed on the study's scope and methodological framework and independently agreed to contribute anonymized responses. The dataset was processed without the inclusion of identifying details, ensuring adherence to accepted standards of research ethics and data protection.

Results

A comparative analysis of the dynamics of foreign language acquisition in the control and experimental groups showed significant differences. The introduction of the bilingual education model (BAM) in engineering education in Kazakhstan had a significant impact on student progress [12]. In the control group, the changes were insignificant, while in the experimental group, students showed a rapid transition from initial levels (A1–A2) to intermediate and advanced levels (B1– B2).

Table 1 - Distribution of students across CEFR levels before and after the experiment (%)

Level	*Control group (before)*	*Control group (after)*	*Experimental group (before)*	*Experimental group (after)*
A1	14	13	15	8
A2	49	47	48	33
B1	32	35	32	41
B2	5	8	5	18

Note: The experimental group demonstrates a clear progression toward higher proficiency levels (B1–B2), while the control group shows slower dynamics.

The data in Table 1 show that the proportion of students at level A1 remained virtually unchanged in the control group (14% → 13%), while in the experimental group it fell by almost half (15% → 8%). Significant changes occurred at the B2 level: in the control group, the increase was only 3% (5% → 8%), while in the experimental group it grew from 5% to 18%. This confirms that BAM creates conditions for students to reach an advanced level of foreign language proficiency more quickly. These results are consistent with international studies. A statistical test using a t-test showed that the differences between the control and experimental groups were significant ($p < 0.05$). In Canada, bilingual programmes also show accelerated growth of students from beginner to intermediate (B1) levels in one semester of study (Cummins, 2021). In India, the introduction of a trilingual model resulted in an increase in English proficiency among engineering students to level B2 (Sharma & Hannafin, 2007). The European experience with CLIL programmes (Coyle et al., 2010) demonstrates similar dynamics, where the integration of subject and language learning enhances progress towards higher CEFR levels. Figure 1 visualises the distribution of students in the experimental group by CEFR levels before and after the experiment.

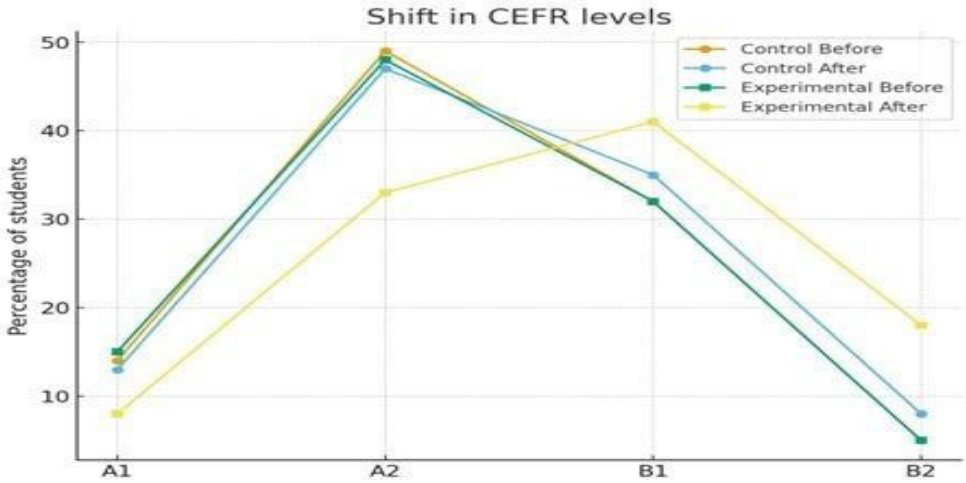

Figure 1 – A shift in CEFR levels within the experimental group

The distribution of proficiency levels demonstrates a noticeable shift, with fewer students remaining at lower levels and a growing concentration within the B1–B2 range. The second area of analysis concerned the relationship between students' digital activity and their results.

Thus, for the first time in the practice of engineering education in Kazakhstan, it has been experimentally shown that the bilingual model accelerates the transition of students to levels B1–B2, while the traditional teaching method produces slower results.

The next area of analysis concerned the relationship between digital activity and academic achievement [12]. It was found that the level of student engagement with online platforms (Moodle and Microsoft Teams) was directly correlated with their results.

Table 2 - Correlation between digital activity and learning outcomes

Digital activity (Moodle/Teams)	*Average score increase (%)*
Low (≤1 login per week)	+6
Medium (2–3 logins per week)	+11
High (≥4 logins per week)	+17

Note: Higher engagement with digital platforms is strongly associated with greater learning gains.

As can be seen from Table 2, students who rarely used digital resources (no more than one login per week) improved their results by only 6%. Those who used the platforms 2–3 times a week showed an 11% increase. The largest increase (17%) was observed among students who regularly worked with Moodle and Teams. The differences between the low- and high-activity groups were statistically significant (ANOVA, $p < 0.01$), confirming a consistent link between digital engagement and learning outcomes.

These data coincide with the results of the OECD (2022), which noted that the use of digital platforms in blended learning increases academic achievement by an average of 10–15%. Similar patterns were observed in studies by Horn & Staker (2014), where students with high engagement in online courses demonstrated faster growth in language skills. Figure 2 illustrates this relationship: the higher the activity in digital environments, the more noticeable the growth in final scores.

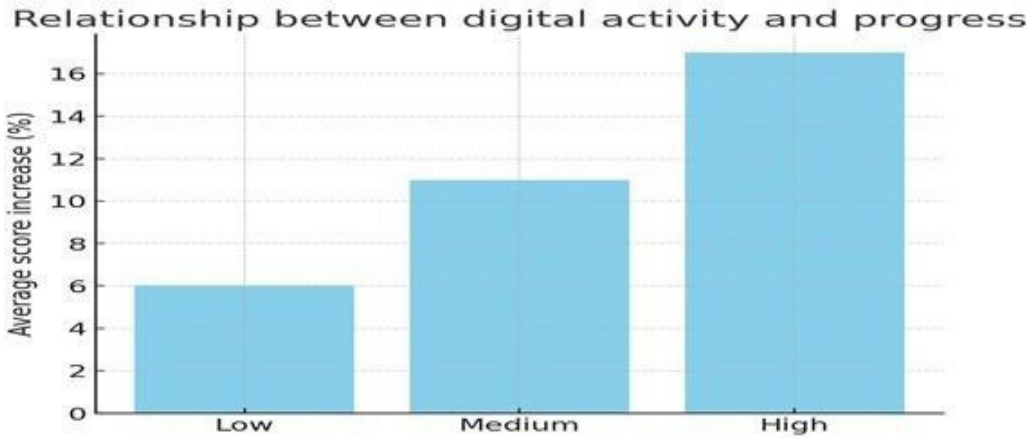

Figure 2 - Relationship between digital activity and progress in test scores

This allows us to conclude that digital tools enhance the effectiveness of the bilingual model. These data demonstrate that student activity in the digital environment not only supports the learning process but also acts as a catalyst for academic growth [13]. This study is the first to show that it is the combination of the bilingual model and digital tools that enhances the results of students at a technical university.

The third aspect of the study is related to code-switching [14]. Analysis of audio and video recordings of classes showed that switching between languages occurred mainly when explaining terms and complex concepts, rather than for everyday communication.

Table 3- Functions of code-switching in the experimental group (%)

Function	*Share (%)*
Explaining technical terms	40
Checking comprehension	27
Providing emotional support	22
Organisational remarks	11

Note: The dominant role of code-switching lies in explaining technical terminology, which highlights its cognitive and academic function.

Table 3 shows that 40% of code-switching cases were related to explaining technical terms, and another 27% were related to checking understanding of the material. This confirms that code-switching performs a cognitive and academic function and is not used in everyday communication. The results are comparable to the conclusions of García & Wei (2014), where code-switching is seen as a resource for explaining terminology and supporting the understanding of complex concepts. Studies conducted in the EU have noted that academic code-switching increases the effectiveness of specialised vocabulary acquisition (Coyle et al., 2010). Figure 3 clearly shows that it is the explanation of terminology that plays a leading role in bilingual interaction, which is consistent with the research hypothesis.

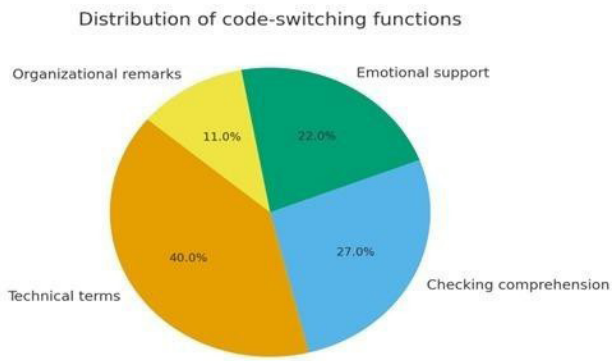

Figure 3 - Distribution of code-switching functions in bilingual instruction

Code-switching performed a cognitive rather than a compensatory function, facilitating the acquisition of technical terminology and reducing the cognitive load on students. This confirms the original research hypothesis: in a bilingual environment, code-switching becomes a tool for academic support. The identified differences in the distribution of code-switching functions were also statistically significant (χ^2, $p < 0.05$).

Finally, the use of social network analysis methods revealed qualitative changes like student interaction within project activities [15]. Figure 4 shows that the experimental group exhibited denser network connections, with a more uniform and stable interaction structure.

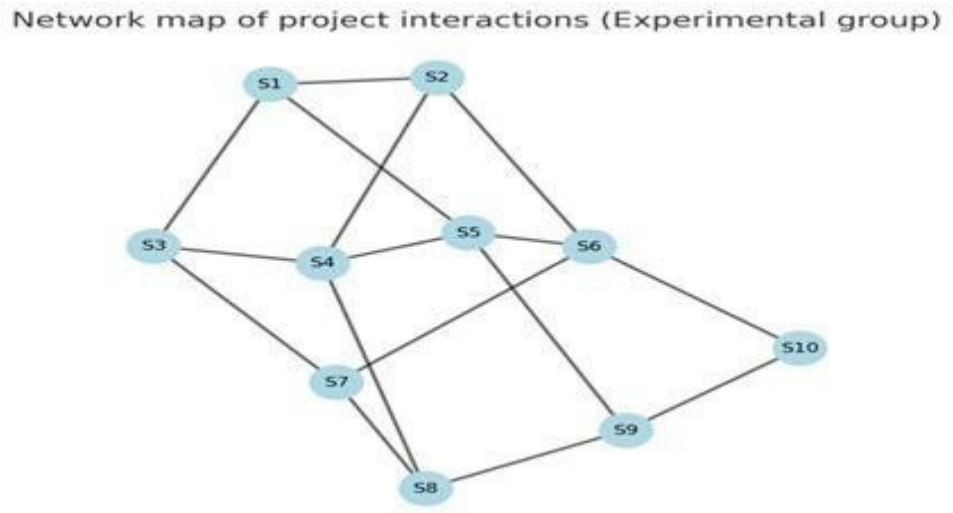

Figure 4 - Network map of project interactions in the experimental group

The visualization of peer exchanges suggests that the experimental group did not interact randomly; instead, communication became concentrated around several consistently active participants, creating a more interconnected and internally structured pattern of collaboration. This indicates that the bilingual model not only improves foreign language proficiency but also contributes to the development of teamwork, leadership, and mutual support skills.

These data show that the bilingual model not only improves foreign language proficiency but also contributes to the development of teamwork and leadership skills. The novelty of this result lies in the fact that, for the first time in a Kazakhstani engineering university, a link has been established between the bilingual teaching format and the structure of student communication networks.

Overall, the results of the study demonstrate that the bilingual model, combined with digital tools and project-based learning, opens new opportunities for improving academic performance and developing professionally relevant competencies among students at technical universities.

Discussion

The results of the study demonstrate that the bilingual academic model (BAM), adapted to engineering education in Kazakhstan, can address not only language training issues but also broader issues of inclusion and academic integration of students in a trilingual environment. Unlike most studies conducted in Europe or North America, where bilingual practices are analysed primarily in the humanities (García & Wei, 2014; Cummins, 2021), this work focuses on engineering disciplines for the first time on engineering disciplines, which fills a notable research gap.

A comparison with international practice highlights several substantive distinctions. In Canada, bilingualism is framed as a means of maintaining cultural cohesion between French and English; in India, it operates as a strategy for sustaining regional languages alongside the dominant role of English; in Europe, it is closely linked to academic mobility initiatives such as Erasmus+. The Kazakhstani context differs in that bilingual interaction unfolds within a structured trilingual configuration (Kazakh, Russian, and English), where English performs the function of a global academic medium, while Kazakh and Russian act as culturally and socially anchoring languages. This particular alignment of linguistic roles positions Kazakhstan as a distinct and analytically significant case in international discourse.

From a scientific point of view, the study showed that BAM helps reduce cognitive load when switching between language codes and provides equal access to learning materials in a multilingual group. In this context, digital tools have become not just a support but an integral part of the pedagogical strategy: online platforms were used for asynchronous work, which increased inclusiveness and allowed students with different language proficiency levels to follow their own individual trajectories. This approach differs from the practice described by the OECD (2022), where digitalisation is primarily interpreted as a means of scaling access.

The novelty of the study is evident in several aspects. First, a bilingual academic model was tested for the first time in the context of engineering education in Kazakhstan. Second, a systematic analysis of its effectiveness in a trilingual environment was conducted, which had not previously been recorded in international publications. Thirdly, the study showed that inclusive practices based on BAM can not only improve language training but also strengthen students' academic engagement.

The practical significance of the results is that they open opportunities for scaling BAM to other technical universities in Kazakhstan and Central Asia. Moreover, the data may be useful for countries with multilingual education policies, such as India, South Africa, or Switzerland.

Thus, the Kazakhstani experience demonstrates that the bilingual model can be effective precisely in complex multilingual configurations, where academic productivity and cultural sustainability must be considered simultaneously. This contributes to the international field of research on inclusion and bilingual education, which has so far been dominated by examples with simpler language structures.

The interpretation of the findings should take into account the contextual boundaries of the study. The empirical base was limited to a single institutional setting, which constrains the extent to which the observed patterns may reflect broader tendencies across engineering education in Kazakhstan. In addition, variations in students' socio-economic circumstances and their prior exposure to foreign language instruction before university entry were not systematically examined, although these factors may have shaped language development trajectories. Furthermore, the analytical timeframe was confined to one academic cycle, leaving open questions regarding the durability and longitudinal impact of the bilingual academic model (BAM).

Extending the empirical landscape beyond a single institutional context would make it possible to trace structural similarities and divergences across technical universities in Kazakhstan. A closer examination of how socio-economic positioning intersects with multilingual learning trajectories could clarify uneven patterns of academic progression. Gender-specific participation dynamics and the influence of professional specialization also remain insufficiently articulated within multilingual engineering education and merit systematic analytical attention. Another line of inquiry may focus on the structural compatibility of the BAM framework with CLIL-based instructional design and blended delivery formats, particularly in relation to inclusive pedagogical configurations and measurable learning outcomes.

This study is not limited to confirming the conclusions obtained in other countries. The Kazakh case demonstrates that the bilingual academic model (BAM) is capable not only of adapting to engineering specialities, but also of transforming existing pedagogical practices. Unlike traditional CLIL programmes, BAM integrates inclusive mechanisms and digital tools, allowing language learning to be combined with professional training more organically. Thus, the study complements global theory on bilingual education with new data on the engineering context and shows that it is this context that is becoming a catalyst for innovation in the field of inclusion and multilingualism.

Conclusion

The study showed that the bilingual academic model (BAM) has great potential for improving the quality of training for engineering students at technical universities. It contributes not only to the development of foreign

language competence but also to the formation of sustainable learning motivation and facilitates the acquisition of professional terminology using cognitive strategies, including code-switching. Empirical evidence from the study indicates that sustained engagement with digital learning platforms corresponds with higher levels of academic attainment and intensifies the functional impact of the BAM framework. The model extends beyond the boundaries of a single institutional setting, as its structural configuration aligns with internationally established pedagogical formats, including CLIL-oriented instruction and hybrid delivery models. Within the trilingual educational architecture of Kazakhstan, this convergence suggests that BAM may serve as a scalable mechanism for reconfiguring engineering education at a systemic level.

The practical contribution of the findings is reflected in clearly defined measures for integrating the model into the educational process:

- incorporation of bilingual instructional elements into engineering courses using Moodle and Microsoft Teams platforms,
- targeted professional development for faculty working in multilingual settings, including training in CLIL and blended learning approaches,
- institutional adjustments to workload policies for instructors engaged in bilingual initiatives,
- upgrading digital infrastructure, particularly in regional universities, to provide equitable learning conditions for all students.

Thus, BAM can be seen as a strategic direction for the modernisation of higher engineering education, combining the principles of multilingualism, digitalisation, and inclusion to form a new model of educational practice that meets global challenges.

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КӨПТІЛДІ ТЕХНИКАЛЫҚ ЖОҒАРЫ ОҚУ ОРНЫНДА ШЕТ ТІЛДЕРІН ИНКЛЮЗИВТІ ОҚЫТУ

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Андатпа. Трилингвизм қағидатына негізделген Қазақстанның қазіргі тіл саясаты инженерлік бағыттағы студенттерді даярлау сапасын арттырудың жаңа тәсілдерін талап етеді. Бұл жағдайда екі тілді және инклюзивті тәжірибелерді енгізу өзекті болып отыр, бірақ олардың болашақ инженерлердің академиялық нәтижелеріне әсері жеткілікті зерттелмеген. Зерттеудің мақсаты шет тілдік құзыреттілікті дамыту және техникалық университет студенттерінің оқу мотивациясын арттыру құралы ретінде екі тілді академиялық модельдің (ВАМ) тиімділігін бағалау болды. Зерттеуге Әбілқас Сағынов атындағы Қарағанды техникалық университетінің (2023–2024 жж.) 124 студенті қатысты. Oxford Placement Test, өңдеудің статистикалық әдістері (t-test, ANOVA, σ2), сондай-ақ Moodle және

Microsoft Teams-тағы сандық белсенділікті талдау қолданылды. Сапалы деректер тақырыптық кодтау әдісімен талданған жартылай құрылымдалған сұхбаттарда алынды. BAM бойынша оқыған эксперименттік топта B2 деңгейіне жеткен студенттер үлесінің 12% - дан 29% - ға дейін өсуі тіркелді (t-test, $P < 0.05$). Ең үлкен өсім (17%) цифрлық платформаларда тұрақты жұмыс істейтін студенттерде байқалды (ANOVA, $p < 0.01$). Сұхбаттар кодты ауыстыру инженерлік терминологияны меңгеруді жеңілдететін когнитивті функцияны орындайтынын көрсетті. Зерттеу инженерлік білім берудегі көптілділікті, цифрландыруды және инклюзивті тәжірибелерді біріктіретін модель ретінде BAM тиімділігін көрсетеді. Болашақта оны қолдануды CLIL және blended learning-пен біріктіру арқылы кеңейтуге болады. Сонымен қатар, зерттеудің шектеулері бар: ол тек бір университетті қамтиды және студенттердің әлеуметтік-экономикалық жағдайын ескермейді. Қосымша зерттеулер анықталған әсерлердің тұрақтылығын растау үшін кең контингентті және ұзақ мерзімді бақылауды қамтуы керек.

Тірек сөздер: инклюзивті білім беру, шет тілдерін оқыту, техникалық ЖОО, билингвизм, көптілді орта, Қазақстан, инженерлік білім беру, цифрлық білім беру технологиялары

ИНКЛЮЗИВНОЕ ОБУЧЕНИЕ ИНОСТРАННЫМ ЯЗЫКАМ В ПОЛИЯЗЫЧНОМ ТЕХНИЧЕСКОМ ВУЗЕ.

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Аннотация. Современная языковая политика Казахстана, основанная на принципе трилингвизма, требует новых подходов к повышению качества подготовки студентов инженерных направлений. В этих условиях актуальным становится внедрение билингвальных и инклюзивных практик, однако их влияние на академические результаты будущих инженеров изучено недостаточно. Цель исследования заключалась в оценке эффективности билингвальной академической модели (BAM) как инструмента развития иноязычной компетенции и повышения учебной мотивации студентов технического вуза. В исследовании приняли участие 124 студента Карагандинского технического университета имени Абылкаса Сагинова (2023–2024 гг.). Использовались Oxford Placement Test, статистические методы обработки (t-test, ANOVA, χ^2), а также анализ цифровой активности в Moodle и Microsoft Teams. Качественные данные получены в ходе полуструктурированных интервью, которые были проанализированы методом тематического кодирования. В экспериментальной группе, обучавшейся по BAM, зафиксирован рост доли студентов, достигших уровня

B2, с 12% до 29% (t-test, p <0.05). Наибольший прирост (17%) наблюдался у студентов, регулярно работавших в цифровых платформах (ANOVA, p <0.01). Интервью показали, что код-свитчинг выполнял когнитивную функцию, облегчая усвоение инженерной терминологии. Исследование демонстрирует эффективность BAM как модели, интегрирующей многоязычие, цифровизацию и инклюзивные практики в инженерном образовании. В перспективе её применение может быть расширено за счёт сочетания с CLIL и blended learning. Вместе с тем исследование имеет ограничения: оно охватывает только один университет и не учитывает социально-экономический фон студентов. Дальнейшие исследования должны включать более широкий контингент и долгосрочный мониторинг для подтверждения устойчивости выявленных эффектов.

Ключевые слова: инклюзивное образование, преподавание иностранных языков, технический вуз, билингвизм, многоязычная среда, Казахстан, инженерное образование, цифровые образовательные технологии

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