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Enhancing internationalization at home in biomedical education: Evidence from a multi-institutional Erasmus+ Capacity-Building project in the Western Balkans

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ABSTRACT

This is a comprehensive analysis study related to the integration of internationalization at home among seven universities within the framework of the BIOSINT project: "Strengthening capacities and digital competences in biomedical education through internationalization at home," - Erasmus+ Capacity Building in Higher Education project – Strand 2 (ERASMUS-EDU-2022-CBHE, action: ERASMUS-LS), 101082863, co-funded by the European Union. Surveys were conducted among 2,927 students, 308 academic staff, and seven Deans. The data were analyzed, and chi-square tests and descriptive comparisons were made to evaluate topics such as mobility interest, language proficiency, and institutional support. Qualitative responses were also examined to better understand barriers and opportunities. Based on the results, SWOT analyses were performed, and a common framework was developed for creating strategies for each institution for Internationalization at Home. Actions such as curriculum internationalization, the introduction of virtual classrooms, mentoring systems, incoming guides, security protocols, and training related to IaH for staff and students were implemented during the project. Statistical analysis showed a significant improvement in the IaH index among the participating institutions. Specifically, the overall IaH index increased from an average of 39.3% to 55.6%, a statistically significant change (t = 41.00, p < 0.001), reflecting enhanced maturity levels across the partner institutions. This demonstrates the efficacy of the BIOSINT project implementation. Further steps should be taken to increase the impact of activities related to IaH.

Contribution/Originality: This study contributes to the existing literature by providing the first multi-institutional assessment of Internationalization at Home in biomedical education in the Western Balkans. This study uses a new estimation methodology through an IaH maturity index. This study documents significant pre–post institutional improvements across students, staff, and leadership.

1. INTRODUCTION

Internationalization at Home (IaH) refers to the integration of international and intercultural perspectives, experiences, and activities into the academic environment without the need for physical mobility abroad (Beelen & Jones, 2015). The idea is that although not all students have the possibility to go abroad, they should develop intercultural skills and capacities for working worldwide. In this way, home students will have a taste of being abroad and facing the global environment in the future. IaH also influences the development of higher education institutions. It is certain that in the 21st century, IaH should be an integral part of higher education systems. Indeed, the number of individuals who have participated in outgoing mobilities is low compared to the total, at 2.4% of 220 million university students (UNESCO, 2019).

IaH also strengthens higher education institutions by creating an inclusive, multicultural environment that attracts international students and improves the quality of teaching. The integration of IaH is strongly supported by important organizations such as the European Parliament, the European Higher Education Area, the European Commission, and the American Council on Education (American Council on Education, 2023; European Commission, 2013; European Higher Education Area (EHEA), 2012; European Parliament, 2015).

Modern and up-to-date practices such as Collaborative Online International Learning (COIL) further extend its impact by promoting virtual exchange and intercultural collaboration (Jager, Nissen, & Helm, 2019; Wu, Zhang, & Li, 2022). During the implementation process of the IaH, various challenges can be identified, including resistance from faculty representatives, limited resources, and bureaucratic barriers (Almeida, Robson, Morosini, & Baranzeli, 2018; Wijnen-Meijer, 2023). To overcome these obstacles, it is essential to develop clear institutional strategies, foster stakeholder interest and engagement, and promote international cooperation.

The Erasmus+ BIOSINT project (Strengthening Capacities and Digital Competences in Biomedical Education through Internationalization at Home) was created to promote IaH across biomedical faculties in the Western Balkans. The University of Kragujevac, as a coordinator, together with the support of KU Leuven and Victor Babes University of Medicine and Pharmacy, has guided the activities of the project: internationalization of the existing and new curricula, the creation of virtual classrooms, staff and student training related to IaH, the creation of a buddy system, safety and security protocols, and an incoming guide for international staff and students. This article aims to analyze the current situation of IaH in seven Western Balkan universities: University of Kragujevac (UNIKG), University of Medicine Tirana (UMT), University of Shkodra (UNISHK), University of Tuzla (UNTZ), University of Montenegro (UoM), University of East Sarajevo (UES), and University of Mostar (SUM). The analysis is based on questionnaires administered to students, teachers, and deans, with the goal of identifying strengths, weaknesses, opportunities, and threats. Additionally, the study seeks to evaluate the impact of the measures implemented through the project.

2. LITERATURE REVIEW

Internationalization at Home (IaH) has evolved as a strategic response to the limitations of mobility-based internationalization, recognizing that only a minority of students can participate in physical exchange due to financial, linguistic, structural, or personal barriers (Beelen & Jones, 2015; Nilsson, 2003). IaH focuses on embedding international, intercultural, and global dimensions into teaching, learning, and campus life to ensure that all students, regardless of mobility, gain relevant global competencies (Robson, 2017). Foundational policy frameworks, including the European Higher Education Area (EHEA) (2012), the European Commission (2013), the European Parliament (2015), UNESCO (2019), and American Council on Education (2023), collectively emphasize IaH as essential to inclusive, high-quality higher education.

Scholarly work has further conceptualized IaH as a transformative curricular practice. Leask (2015) argues that internationalizing the curriculum requires systematic integration of global learning outcomes across disciplines,

assessments, and pedagogical design. Harrison (2015) cautions that IaH must move beyond symbolic activities toward deeper, learning-centered approaches that reshape both teaching practice and institutional culture. Hoffman (2003) and Robson (2017) similarly highlight that faculty development and institutional commitment are crucial for successful IaH implementation, as academic staff play a central role in creating interculturally enriched learning environments.

A substantial body of empirical research demonstrates the effectiveness of IaH strategies across formal and informal learning contexts. Curricular approaches such as English-medium instruction (Ishikura, 2015), culturally enriched learning activities (Barbosa, Santos, & Prado-Meza, 2020), and discipline-specific IaH curriculum design (Falkenberg & Joyce, 2023) have been shown to enhance student learning, intercultural awareness, and motivation (Meng, Zhu, & Cao, 2017). Informal social and campus-based interactions also contribute to multicultural learning environments, particularly when supported by intentional programming. Studies from diverse contexts, including Brazil, Scandinavia, and East Asia, demonstrate that IaH practices can be adapted to local institutional realities and remain impactful even in resource-constrained settings (Almeida et al., 2018; Barbosa et al., 2020; Finardi & Aşık, 2024; Nilsson, 2003).

Virtual exchange and technology-enabled learning have become core components of contemporary Internationalization at Home (IaH). Virtual exchange fosters cross-border collaboration through structured online intercultural tasks and is supported by well-established pedagogical frameworks such as the Community of Inquiry (Chan et al., 2024; Jager et al., 2019). These interventions have been shown to improve intercultural competence, communication, social presence, and mutual understanding, particularly when designed with clear learning outcomes and sustained interaction (Chan & Nyback, 2015; Custer & Tuominen, 2016; Jung, De Gagne, Choi, & Lee, 2022). A systematic review by Soulé, Parmaxi, and Nicolaou (2025) confirms that virtual IaH practices improve empathy, confidence, and psychological well-being, reflecting their broad pedagogical potential.

The health and biomedical sciences have become a particularly fertile area for Internationalization at Home (IaH) research due to the globalized nature of healthcare and the necessity of cultural competence in clinical practice. Studies consistently show that IaH contributes to improved cultural awareness, professional communication, and patient-centered care among nursing and medical students (Huang, Terry, & Peck, 2023; Wijnen-Meijer, 2023; Wu et al., 2022). Cultural immersion programs, even when conducted virtually, enhance student preparedness for diverse clinical environments (Buchanan, Velandia, Weckend, & Bayes, 2021). In medical education, combining virtual exchange with clinical simulation has been shown to significantly strengthen intercultural competence and psychological well-being (Galán-Lominchar, García-Cabrero, & Bermúdez, 2024). Additionally, IaH contributes to research culture and scholarly development among postgraduate students, showing benefits beyond undergraduate teaching (Leung et al., 2021).

Despite its promise, IaH also faces several challenges. Research highlights uneven adoption across institutions, insufficient staff training, lack of coherent strategy, and limited assessment of learning outcomes (Harrison, 2015; Wihlborg & Robson, 2018). Some IaH initiatives risk becoming superficial if not grounded in evidence-based curriculum design (Harrison, 2015). Scholars also emphasize the need for context-sensitive approaches, as IaH models developed in Western contexts may not align with the priorities or constraints of institutions in the Global South (Almeida et al., 2018; Finardi & Aşık, 2024). Nevertheless, the literature consistently underscores that meaningful IaH requires integrated institutional structures, leadership commitment, faculty engagement, and mechanisms for evaluation (American Council on Education, 2023; Wihlborg & Robson, 2018).

Taken together, the existing literature demonstrates that IaH is a flexible and inclusive framework capable of enriching student learning, strengthening intercultural competence, and supporting faculty development across diverse higher education contexts. However, most published studies examine single institutions, isolated interventions, or discipline-specific cases, with limited evidence on how IaH evolves systemically within biomedical faculties, particularly in regions where mobility remains structurally constrained. Furthermore, few studies propose

comprehensive tools for monitoring institutional progress or assessing IaH maturity over time. These gaps are especially salient in the Western Balkan context, where universities face significant mobility limitations but increasingly prioritize internationalization. Building upon this body of work, the present study provides a multi-institutional analysis of IaH implementation across seven biomedical faculties in the Western Balkans and introduces a structured IaH maturity index that synthesizes student, staff, and leadership perspectives to evaluate institutional progress following targeted Erasmus+ BIOSINT capacity-building interventions.

3. MATERIALS AND METHODS

Three surveys were conducted for each institution: for students, academic staff, and the respective deans. In the surveys, the following faculties participated: 1. Faculty of Dental Medicine, University of Medicine, Tirana (UMT). 2. Faculty of Medicine, University of East Sarajevo (UES). 3. Department of Pre-Clinic Subjects, University of Shkodra (UNISHK). 4. Faculty of Medicine, University of Mostar (SUM). 5. Faculty of Medicine, University of Montenegro (UoM). 6. Faculty of Medicine, University of Tuzla (UNTZ). 7. Faculty of Medicine, University of Kragujevac.

The surveys consisted of structured questions, including institutional support, mobility interest, language proficiency, and perceptions of international engagement. The data were analyzed to identify the weakest points, strengths, and possibilities for improvement related to the situation of internationalization at home. The surveys included both quantitative and qualitative answers to fully understand and analyze the situation. In addition to the survey, opinions were gathered from staff and students to understand further difficulties.

4. RESULTS

4.1. Students Survey

The survey for students contained four main domains: 1. General information. 2. Interest in studying abroad. 3. English language and internationalization of the curriculum. 4. Contact information. A total of 2,729 valid responses were obtained. The average age group was 21–24 years, and most students were in their second or third year of study. Data were gathered and analyzed through descriptive statistics and Chi-square tests to make comparisons for each category and to analyze the situation in each institution.

Section I: General Characteristics of Respondents.

A total of 2,927 students from seven universities participated in the BIOSINT project survey, representing various health-related study programs. This section presents a comparative analysis of their general demographic and academic profiles.

1. Study Programs

Among the students who participated in the surveys, most of them were from the Medicine program, particularly dominant at the University of Mostar (71.89%), University of East Sarajevo (63.61%), and University of Tuzla (100.00%). The University of Medicine Tirana (UMT) had the highest percentage of students in the field of Dentistry (70.42%), while the University of Shkodra (UNISHK) had a majority of students from General Nursing (52.49%). The University of Montenegro (UoM) had the most diverse distribution, with Applied Physiotherapy being the leading program (38.50%).

2. Year Of Study Distribution

Most of the students varied between the first and third years, an indicator that the younger generation is more willing to participate in activities related to IaH. Notably, UMT, UNIKG, and UoM showed the highest concentrations in the 3rd and 1st years, while UNISHK had the highest participation in the 2nd year.

3. Gender Distribution

There was a notable difference regarding the gender of the students, mainly female students. It is in line with the general trend worldwide in health sciences. The highest values were at UNISHK (79.77%) and SUM (77.88%). The

University of Montenegro had the highest percentage of students who did not disclose their gender (27.00%), which might require future explanation regarding their perception of privacy.

4. Age Distribution

Most of the students were under 25 years old, mostly at UMT (96.47%) and UNIKG (93.03%). The University of Montenegro showed a more diverse age distribution, with over 12% of students aged 30 or older, likely in program types that attract non-traditional students.

Section II.

Interest in Studying Abroad: As observed in Table 1. UMT and UNISHK had the most motivated students regarding mobility, with over 50% and 45% respectively, being fully interested. UniKG and UOM showed the highest disinterest rates, at over 25%. A Chi-square test confirmed that these differences were statistically significant (χ^2 = 400.50, df = 12, p < 0.001), indicating a strong institutional effect on student mobility attitudes.

Table 1. Interest in studying abroad.

University	Fully interested (%)	Partially interested (%)	Not interested (%)
SUM	46.5	38.3	15.2
UES	34.9	44.7	20.5
UMT	53.7	40.2	6.1
UniKG	30.1	41.8	28.1
UNISHK	44.9	45.8	9.1
UNTZ	37.2	49.4	13.4
UOM	37.3	35.8	26.5

Preferred Duration of Study Abroad by University. Based on the results of Table 2, the most desired option among students regarding the duration of study abroad was one semester, particularly at UNTZ (26.1%) and UNISHK (25.5%). This aligns with the Erasmus mobility program. Programs lasting 1–2 months, often preferred by students with curricular or financial constraints, were favored at UoM (28.8%) and UNTZ (25.9%). Short-term mobility (1–2 weeks) was also selected as the preferred option, especially by students from SUM (24.0%) and UniKG (22.8%), indicating that flexibility is important. A smaller proportion of students opted for longer practical experiences (more than 2 months), ranging from 8.2% (UniKG) to 12.2% (UES). Disinterest levels in studying abroad varied from 17.0% (UMT) to 22.5% (UoM), suggesting that while overall interest is high, a significant minority may require additional motivation or institutional support. The Chi-Square Test was performed, resulting in: χ^2 = 6.08, df = 24, p = 0.9999. No statistically significant differences were found among the universities; most students preferred a semester or 1–2 month program.

Table 2. Preferred duration of study abroad by university (%).

University	1 semester	1–2 months	1–2 weeks	2+ months (Practice)	Not interested
SUM	21.7	25.8	24.0	8.8	19.8
UES	23.2	22.0	21.7	12.2	20.8
UMT	24.4	25.4	21.9	11.3	17.0
UNISHK	25.5	21.7	21.4	10.0	21.4
UNTZ	26.1	25.9	20.2	10.2	17.6
UOM	23.0	28.8	16.5	9.2	22.5
UniKG	23.6	24.0	22.8	8.2	21.4

Main motivation for studying abroad by university. Table 3 reflects the main reasons students declare for wanting to study abroad. The options included were: academic enrichment, better job prospects, cultural exposure, intercultural skills development, language improvement, and disinterest. The most preferred answer was better job prospects among nearly all students, with the highest percentages observed at UoM (28.5%), SUM and UNISHK (both 25.8%), UES and UniKG (around 24.5%). Language improvement was particularly significant at UoM (24.2%),

UniKG (22.1%), UMT, and UES (approximately 20.5%). Academic enrichment was the second most preferred answer in several institutions: UMT (20.6%) had the highest value in this category. SUM, UNTZ, and UNISHK also showed relatively balanced scores between academic and career motivations. Cultural exposure and intercultural capacities were two important factors: UniKG had the highest values in the category of cultural exposure (21.6%). UES and UNTZ showed relatively high values related to intercultural skills (15.6% and 14.9%, respectively). Disinterest was low among all participating institutions, with values under 7%, further confirming strong overall support for international mobility: UMT had the lowest percentage of disinterest (3.5%). SUM and UNISHK had slightly higher levels (approximately 6.5%). The data suggest that students' main reasons for going abroad are to develop professionally. They see it as an option to advance in the job market, rather than for academic or intercultural motivation. A chi-square test was conducted, $\chi^2 = 9.80$, df = 30, p = 0.9998, and no significant statistical differences were noted among the reasons chosen by students across universities.

Table 3. Main motivation for studying abroad by university (%).

University	Academic enrichment	Better job prospects	Cultural exposure	Intercultural skills	Language improvement	Not interested
SUM	18.9	25.8	18.0	11.5	18.9	6.9
UES	16.8	24.8	18.0	15.6	20.5	4.3
UMT	20.6	20.6	19.3	15.4	20.6	3.5
UNISHK	17.6	25.8	17.6	15.2	17.3	6.5
UNTZ	18.5	24.0	16.9	14.9	19.4	6.3
UOM	16.0	28.5	18.5	9.0	24.2	3.8
UniKG	14.4	24.5	21.6	13.5	22.1	3.8

Willingness to Apply Next Year by University. Table 4 summarizes students' intentions to apply for the upcoming year. The percentage of students answering "yes" ranged from 43.1% to 46.6%, indicating a generally high motivation among students to participate in mobility programs. The highest percentage of students willing to apply was observed at UMT (46.6%), followed closely by UoM (46.2%) and UES (45.9%). The "Not Sure" category, which may reflect students lacking sufficient information or support, varied from 21.5% at UMT (the lowest uncertainty) to 29.5% at SUM (the highest uncertainty), highlighting a need for improved communication and reassurance. The "No" responses ranged from 26% to 32%, demonstrating a moderate but consistent group of students unlikely to engage in mobility programs. UMT and UNISHK had the highest rates of disinterest (31.8% and 31.4%, respectively), while UES and SUM had the lowest (26.6% and 26.7%, respectively). A chi-square test examining inter-university differences was conducted: $\chi^2 = 2.72$, df = 12, p = 0.9972. No significant statistical difference was found, supporting the general regional consensus on pro-mobility participation, and highlighting that institutional barriers, rather than motivation, might be an obstacle to conducting mobilities.

Table 4. Willingness to apply next year by university (%).

University	No	Not sure	Yes
SUM	26.7	29.5	43.8
UES	26.6	27.5	45.9
UMT	31.8	21.5	46.6
UNISHK	31.4	25.5	43.1
UNTZ	30.1	24.5	45.3
UOM	28.8	25.0	46.2
UniKG	28.1	28.1	43.8

Section III: English & Internationalization.

Table 5 summarizes students' perceptions of internationalization and the role of English language competence in their education across the seven BIOSINT universities. Across all seven universities, students expressed very

positive views about English and internationalization. Most students rated their international experience and cultural awareness highly, especially at the University of Mostar and East Sarajevo. Students strongly agreed that English is important for their future careers, with the highest value noted at UMT. Support for offering English-taught courses throughout all study years was also widespread, reaching over 70% in every institution. These findings show that students across the Western Balkans not only recognize the value of English but also see it as a gateway to professional growth and intercultural understanding.

Table 5. English language and internationalization ratings by university.

University	International experience (1–5)	Cultural awareness (1–5)	English for career (1–5)	Support English all years (%)
SUM	3.85	4.0	3.95	71.9
UES	3.79	3.95	3.92	76.8
UMT	3.78	3.93	4.0	74.3
UNISHK	3.76	3.84	3.89	71.8
UNTZ	3.76	3.87	3.97	76.0
UOM	3.71	3.88	3.92	71.5
UniKG	3.77	3.9	3.96	77.6

Section IV: Mentorship & Engagement

As shown, Table 6 includes the willingness of the students to be mentors for incoming or outgoing participants. The possible answers were: Not Interested, Willing, with Compensation, Willing, without Compensation.

Table 6. Willingness to Mentor by University (%).

University	Info_Request_Percent	Not Interested	Yes, with compensation	Yes, without compensation
SUM	61.3	30.4	26.7	42.9
UES	62.7	37.3	27.5	35.2
UMT	62.4	36.0	29.3	34.7
UNISHK	63.0	34.0	31.7	34.3
UNTZ	62.5	34.4	28.3	37.2
UOM	62.7	36.5	25.8	37.8
UniKG	60.6	36.1	26.4	37.5

According to Table 7, on average, about 34% of students answered that they were not interested in mentoring, while 27% answered that they would do it if they were compensated, and about 37% were willing to mentor without any payment. These averages show that most students, nearly two out of three, are open to being mentors, especially if the program is well organized and offers modest compensation.

Table 7. Descriptive Statistics.

Response Type	Mean (%)	Standard deviation (SD)	Min. (%)	Max. (%)
Not interested	34.4	2.33	30.4	37.3
Yes, with compensation	27.4	1.83	25.8	31.7
Yes, without compensation	37.1	2.97	34.3	42.9

4.2. Teacher Surveys

Section I – Academic Titles of Teaching Staff across the seven participant universities.

The survey was answered by the academic staff of the seven participating universities. 308 was the number of academic staff who responded to the questionnaire related to IaH. The academic titles of the participants indicated a heterogeneous academic background among the teaching staff. There was a relatively balanced distribution of professors, associate professors, and assistants, reflecting both senior and early-career involvement in

internationalization topics. Assistants constituted the largest group, accounting for 37.4% of all surveyed academic staff. Full professors represented 26.8%, and associate professors 22.6%. UNIKG had the highest percentage of full professors (over 40%), indicating a more senior academic level. UNISHK and UMT had the majority of participants as assistants, suggesting a younger teaching demographic involved in the survey. UES showed a relatively balanced distribution among full professors, associate professors, and assistants. The University of SUM and UoM also demonstrated considerable representation of mid-level academic ranks, especially associate professors and docents. This combination is essential, as junior academic staff tend to be more receptive to international activities, while professors play a significant role in increasing institutional agreements and developing curricula.

Section II – International Experience of Academic Staff.

The data from Section II shows a balanced level of international experience among the academic staff who participated in the BIOSINT survey across the seven participating universities. Approximately one-third of academic staff at each university have studied abroad in their country, while about 15% have lived or worked abroad for over a year. Their participation in ongoing professional activities through seminars and conferences is widespread, with percentages ranging from 65% to 70%. Involvement in international projects and guest lecturing abroad remains at a lower level, around 10–12%. These values indicate a positive but moderate involvement in international activities, suggesting further development.

Section III – Attitudes Toward Internationalization (Academic Staff).

The results show high agreement from the academic staff regarding internationalization parameters. The table presents the percentage levels of participants who responded with agree or strongly agree. High values are observed across all parameters.

The questions focused on the perceived value of global experiences, cultural awareness, professional networking, English proficiency, and the need to internationalize curricula. Overall, responses indicate a strong consensus on the importance of these factors for academic and institutional development.

The highest percentage of agreement overall was for the need to establish international study programs (M = 84.7%, SD = 4.2), with numerical values ranging from 78.1% (UNIKG) to 90.5% (UMT). Building international academic connections and recognizing the advantage of global experience also scored high, with mean values of 83.1% and 82.9%, respectively. English for career progression received a slightly lower average (M = 80.4%). UMT consistently showed the highest percentage across all five indicators, indicating a strong involvement and desire to embrace internationalization.

Section IV: Motivation/Ability to Teach in English.

Table 8 Motivation/Ability to Teach in English summarizes four indicators: comfort in teaching in English, willingness to teach in English, need for additional training, and expectation of financial compensation. Four main indicators were assessed using a 5-point Likert scale.

Table 8. Motivation/Ability to teach in English.

University	Mean_Comfort_ Teaching_English	Mean_Wish_to Teach_English	Mean_Need_ Training	Mean_ Expect_Payment
UMT	3.75	4.06	3.69	4.17
SUM	4.0	4.2	3.52	4.08
UES	4.0	4.02	3.54	4.09
UNIKG	3.89	4.15	3.93	4.29
UNISHK	3.46	3.88	4.29	4.0
UNTZ	3.43	3.84	3.89	4.0
UoM	3.33	3.53	3.91	3.57

Overall, the results show that most teachers are willing and motivated to teach in English, especially if they receive proper support and recognition for their efforts. Staff from UES, SUM, UNIKG, and UMT feel most

comfortable and ready to teach, showing strong motivation and confidence. Meanwhile, UoM and UNISHK are less confident but express a high interest in training. The findings suggest a strong interest in teaching in English if sufficient support is given.

4.3. Dean Survey Comparative Analysis

The Deans, as representatives of the seven universities, responded to a survey regarding the situation of IaH in these institutions. In this questionnaire, faculties assess the extent to which they have a comprehensive infrastructure for internationalization at home (IaH). There are 7 categories of questions in this survey: 1) "Internationalization at home" – incentives and support for staff/faculty, 2) Strategy/Regulations/Structures, 3) Quality assurance for "internationalization at home", 4) Internationalization of curriculum/classes, 5) Support for international students, 6) Social integration, 7) Support for home students for "internationalization at home". The aim was to evaluate the situation regarding IaH in each faculty. The results were gathered and analyzed to develop the situation and the strategy for IaH in each institution.

Answers were analyzed to calculate an IaH Index, which reflects the proportion of positive ("YES") responses out of the 42 total indicators. This index provides a clear picture of how developed each faculty is in terms of IaH practices. Based on these results, each university was placed within an Institutional Maturity Level category, as summarized in Table 9, showing how far along they are in building a comprehensive system for IaH.

Table 9. IaH index and institutional maturity level.

University	YES Answers (Out of 42)	IaH Index (%)	Maturity level
UNIKG – Kragujevac	33	78.6	Strategic/Operational maturity
UES – East Sarajevo	31	73.8	Operational maturity
SUM – Mostar	21	50.0	Structured implementation
UNISHK – Shkodra	13	30.9	Emerging implementation
UMT – Medicine Tirana	12	28.6	Emerging implementation
UNTZ – Tuzla	12	28.6	Emerging implementation
UoM – Montenegro	11	26.2	Emerging implementation

The results demonstrate a wide variation in the implementation of the Internationalization strategy. UNIKG - 78.6% and UES -73.8% exhibit the highest levels of institutional development, including the integration of internationalization practices, curricula with international elements, and student services. SUM adopts a structured approach (50.0%), whereas other institutions such as UNISHK, UMT, UNTZ, and UoM, along with their respective faculties, are in the initial stages of implementation (26–31%), indicating the presence of basic activities but a lack of comprehensive strategies and integration.

Improvements and Impact on the IaH Index after the Implementation of the BIOSINT Project.

In order to improve the implementation of IaH, a framework for all institutions was created. Based on the common framework, which was approved by all the participants, individual strategies were developed by each institution.

Table 10 presents a side-by-side comparison of pre- and post-BIOSINT Internationalization at Home (IaH) Index values, including the number of 'YES' responses out of 42 items and institutional maturity classifications. UNIKG is included as a benchmark only in the pre-analysis but excluded from the post-intervention statistical assessment to ensure a neutral evaluation of BIOSINT's broader institutional impact.

Institutional Classification: Based on implementation readiness and scope, universities were grouped as follows: Type I, Strategically Integrated and Operational: UES, UNIKG; Type II, Operational but Unsystematic: SUM; Type III, Fragmented or Emerging: UNTZ, UMT, UNISHK, UoM.

Table 10. Pre- versus post-BIOSINT IaH index comparison.

University	Pre YES	Pre Index (%)	Post Index (%)	Improvement (%)	Maturity Level
UNIKG	33	78.6	-	-	Strategic/Operational maturity
UES	31	73.8	88.1	14.3	Operational maturity
SUM	21	50.0	66.7	16.7	Structured implementation
UNISHK	13	30.9	45.2	14.3	Emerging implementation
UMT	12	28.6	45.2	16.6	Emerging implementation
UNTZ	12	28.6	45.2	16.6	Emerging implementation
UoM	11	26.2	42.9	16.7	Emerging implementation

The results achieved during the implementation of the BIOSINT project demonstrated a statistically significant improvement for the participating institutions. The overall increase in the IaH Index from an average of 39.3% to 55.6% indicates a substantial enhancement at the institutional level, related to strategies and practices. The University of Kragujevac was initially included in the analysis of the internationalization situation at home, participating with questionnaires from students, staff, and the Dean. The institution was not included in the analysis after the project implementation, as it has a leading role and did not have full involvement like the Western Balkan institutions. The data showed a statistically significant improvement (t = 41.00, p < 0.001), highlighting not only the effectiveness of BIOSINT project activities but also the institutional readiness to develop and integrate international and intercultural components. Main areas of progress included the formal adoption of institutional strategies for IaH, the implementation of Buddy systems, the development of Safety and Security protocols for incoming students and staff, the Guide for international students and staff, the internationalization of existing curricula, and the piloting of three new virtual classes: Medical Nutritional Therapy, Health Management in Crisis, and Personalized Medicine. Academic and administrative staff and students from participating institutions engaged in ongoing meetings organized within the BIOSINT framework. Among the key points of the common framework regarding internationalization is the employment of individuals responsible for internationalization issues within faculties. However, this depends on institutional and government policies.

5. DISCUSSION

5.1. Institutional Change and IaH Index Improvement

Structured Internationalization-at-Home (IaH) activities, such as virtual exchanges, collaborative projects, or local community engagement, give students meaningful opportunities to connect across cultures without leaving their own institutions. These experiences have been shown to strengthen intercultural understanding, empathy, and awareness of global health issues, helping students develop the mindset and skills needed to work effectively in diverse professional environments (Buchanan et al., 2021).

The BIOSINT project demonstrated a visible and measurable change in the participating Western Balkan faculties by following a structured process that began with analyzing the existing situation regarding internationalization at home. A SWOT analysis was conducted, and based on the common framework, individual strategies for internationalization at home (IaH) were approved at the faculty level. The average IaH Index increased from 39.3% to 55.6% (Δ = +16.3 percentage points; t = 41.00; p < 0.001). This improvement indicates that even in institutions with limited resources, targeted planning can advance institutional development.

These results echo what other studies have emphasized: internationalization at home is most effective when it is anchored in strong governance structures and institution-wide approaches, rather than scattered or short-term

initiatives (Wihlborg & Robson, 2018; Wu et al., 2022). What stands out here is that this is one of the first times such progress has been documented with solid quantitative evidence in the Western Balkans, a region often overlooked in internationalization research. This demonstrates not only that change is possible but also that it is urgently needed to ensure graduates are better prepared for professional lives in a global and interconnected world.

5.2. Pedagogical Implications for Biomedical and Health Education

The findings of this study have direct implications for biomedical and health education, where graduates must be prepared for a global cultural clinical environment. Survey data confirmed that students across the Western Balkans are highly motivated for international experiences and view English proficiency as a decisive factor for the advancement of their careers. At the same time, academic staff expressed readiness to teach in English. These results show that IaH can enhance both student employability and professional competence.

Global evidence reinforces these conclusions: Brazilian University, after adopting IaH frameworks, reported measurable intercultural benefits (Almeida et al., 2018); Japanese cohorts engaged in English-medium instruction demonstrated heightened cultural awareness (Ishikura, 2015); and medical and nursing students in Europe and Asia participating in COIL or simulation-based interventions showed significant improvements in intercultural competence and psychological well-being (Chan et al., 2024; Galán-Lominchar et al., 2024; Kor, Wong, & Sutanto, 2022). A systematic review of IaH strategies in health education confirmed consistent benefits regarding cultural awareness and communication (Huang et al., 2023). Taken together, this evidence suggests that the measures taken related to the strategy of internationalization at home under the BIOSINT project not only align with global best practices but also demonstrate their importance in the faculties of the Western Balkans.

5.3. Policy and Implementation Considerations

The results of this study show that Internationalization at Home (IaH) should be a sustainable part of institutional policy. Across the participating faculties, students showed motivation to engage internationally, and staff expressed willingness to adapt teaching practices in English. Deans also reported progress in adopting faculty-level IaH strategies, yet highlighted that these remain vulnerable if they are not formally integrated into quality assurance and accreditation processes.

To translate short-term project achievements into lasting impact, several policy steps are important. First, universities should define a dedicated IaH coordinator at the faculty level, who will be responsible for monitoring progress. Second, stable budget lines are necessary in order to support activities such as buddy systems, intercultural training, and virtual courses, so they do not disappear once external funding ends. Third, ministries and accreditation bodies should recognize IaH as a quality indicator, integrating in this way intercultural competencies and bilingual course delivery into national higher education standards. Also, faculty leaders must continue to involve students as co-creators and collaborators, supporting mentorship programs and other international activities. In this way, IaH can evolve from a set of isolated initiatives into an integrated strategy that not only enhances the employability and cultural competence of future health professionals but also strengthens the global competitiveness of Western Balkan biomedical faculties.

6. CONCLUSION

This study demonstrates that Internationalization at Home (IaH) can produce measurable and sustainable change in biomedical education, even in institutions with modest starting capacity. Students showed strong motivation for mobility and recognition of English proficiency as essential for career development, while staff expressed readiness to teach in English with appropriate training and incentives. The following main measures were implemented: faculty-level strategies related to internationalization at home, internationalization of the existing curricula (30 ECTS), and also new internationalized curricula, piloted virtual courses, established mentoring and support systems, such as a

protocol for safety and security, an incoming guide for international staff and students. Together, these measures resulted in a statistically significant increase of the IaH Index across participating faculties, demonstrating that structured faculty-level strategies, curriculum internationalization, and supportive infrastructures can produce measurable and sustainable progress in internationalization at home within biomedical education.

Limitations include differences that exist between the seven participating faculties. They have different sizes and resources. International experience that institutions have also complicates direct comparisons of the results. Moreover, the assessment reflects a short post-implementation period, identifying early indicators.

Future research should go beyond the immediate results and explore how these changes evolve over time. Long-term studies are necessary in order to evaluate if the progress achieved will lead to lasting improvements in teaching, intercultural competence, and graduate readiness for global careers. Qualitative research through interviews, focus groups, and case studies can offer a closer view of how students and staff actually experience internationalization in their daily academic life. Comparisons with other regions would also help identify what makes certain strategies more successful and how they can be integrated into different institutional and cultural environments.

6.1. Recommendations for Practice

The experience of the BIOSINT project demonstrates that meaningful change in Internationalization at Home (IaH) is achievable when short-term initiatives are integrated into daily practice. Universities in the Western Balkans can leverage this progress by formally adopting the existing IaH strategies and appointing coordinators with clearly defined responsibilities, supported by reliable budget allocations. Implementing programs in English, along with staff training, will enhance students' access to internationalized learning. Digital tools such as virtual classrooms, COIL, and simulation-based modules can facilitate connections with international lecturers, offering contemporary and high-quality lectures. Internationalization of curricula is a crucial step, enabling students to participate in common lectures with colleagues from other universities. Additionally, maintaining buddy and mentorship systems, where students actively promote intercultural exchange, can make internationalization more personal and supportive. Incorporating IaH outcomes into accreditation and quality assurance processes will help ensure these efforts are sustainable and become an integral part of biomedical education in the region.

REFERENCES

Almeida, J., Robson, S., Morosini, M., & Baranzeli, C. (2018). Understanding internationalization at home: Perspectives from the global North and South. *European Educational Research Journal*, *18*(2), 200-217. https://doi.org/10.1177/1474904118807537

American Council on Education. (2023). *CIGE model for comprehensive internationalization*. USA: American Council on Education.

Barbosa, B., Santos, C. A., & Prado-Meza, C. M. (2020). There is no one way to internationalization at home: Virtual mobility and student engagement through formal and informal approaches to curricula. *Revista Lusófona de Educação*, *47*, 85–98.

Beelen, J., & Jones, E. (2015). Redefining Internationalization at Home. In A. Curaj, L. Matei, R. Pricopie, J. Salmi, & P. Scott (Eds.), The European Higher Education Area. In (pp. 59–72). Germany: Springer.

Buchanan, K., Velandia, M., Weckend, M., & Bayes, S. (2021). Learning objectives of cultural immersion programs: A scoping review. *Nurse Education Today, 100,* 104832. https://doi.org/10.1016/j.nedt.2021.104832

Chan, E. A., & Nyback, M.-H. (2015). A virtual caravan—A metaphor for home-internationalization through social media: A qualitative content analysis. *Nurse Education Today, 35*(6), 828-832. https://doi.org/10.1016/j.nedt.2015.01.024

Chan, S. L., Fung, J. T. C., Takemura, N., Chau, P. H., Lee, J. J. J., Choi, H. R., . . . Lin, C. C. (2024). Enhancing nursing students' cultural awareness through Community of Inquiry-guided online 'Internationalization at Home'strategies—An intervention study. *Nursing Open, 11*(8), e2251. https://doi.org/10.1002/nop2.2251

Custer, L., & Tuominen, A. (2016). Bringing "internationalization at home" opportunities to community colleges: Design and assessment of an online exchange activity between U.S. and Japanese students. *Teaching Sociology, 45*(4), 347-357. https://doi.org/10.1177/0092055X16679488

European Commission. (2013). *European higher education in the world.* Luxembourg: Publications Office of the European Union.

European Higher Education Area (EHEA). (2012). *Mobility for better learning: Mobility strategy 2020 for the European Higher Education Area.* Luxembourg: European Higher Education Area.

European Parliament. (2015). *Internationalization of higher education.* Luxembourg: European Parliament Policy Department.

Falkenberg, L., & Joyce, A. (2023). Embedding internationalization into biology curricula: A case report of Global change Biology. *Journal of Biological Education, 57*(4), 493–506.

Finardi, K., & Aşık, A. (2024). Possibilities of virtual exchange for Internationalization at Home: Insights from the Global South. *Journal of Virtual Exchange, 7,* 1-22. https://doi.org/10.21827/jve.7.39593

Galán-Lominchar, M., García-Cabrero, J. C., & Bermúdez, M. (2024). Virtual exchange and clinical simulation in medical education: Effects on intercultural competence and psychological well-being. *BMC Medical Education, 24*(1), 185.

Harrison, N. (2015). Practice, problems and power in 'internationalisation at home': Critical reflections on recent research evidence. *Teaching in Higher Education, 20*(4), 412-430. https://doi.org/10.1080/13562517.2015.1022147

Hoffman, D. M. (2003). Internationalisation at home from the inside: Non-native faculty and transformation. *Journal of Studies in International Education, 7*(1), 77-93. https://doi.org/10.1177/1028315302250190

Huang, F., Terry, D. R., & Peck, B. (2023). Effectiveness of Internationalization at Home strategies on cultural competence in health education: A systematic review. *Health Education Journal, 82*(3), 312–328.

Ishikura, Y. (2015). English-medium instruction in Japanese higher education: Enhancing intercultural awareness. *International Journal of Educational Development, 41,* 25–34.

Jager, E., Nissen, E., & Helm, F. (2019). Virtual exchange as innovative practice: A European framework. *Journal of Virtual Exchange, 2*(1), 1–20.

Jung, D., De Gagne, J. C., Choi, E., & Lee, K. (2022). An online international collaborative learning program during the COVID-19 pandemic for nursing students: Mixed methods study. *JMIR Medical Education, 8*(1), e34171. https://doi.org/10.2196/34171

Kor, A., Wong, K. L., & Sutanto, J. (2022). Online intercultural learning for medical and nursing students: Evidence from Hong Kong and Indonesia. *Nurse Education in Practice, 65,* 103478.

Leask, B. (2015). *Internationalizing the curriculum* (1st ed.). UK: Routledge.

Leung, D. Y., Kumlien, C., Bish, M., Carlson, E., Chan, P. S., & Chan, E. A. (2021). Using internationalization-at-home activities to enhance the cultural awareness of health and social science research students: A mixed-method study. *Nurse Education Today, 100,* 104851. https://doi.org/10.1016/j.nedt.2021.104851

Meng, Q., Zhu, C., & Cao, C. (2017). An exploratory study of Chinese university undergraduates' global competence: Effects of internationalisation at home and motivation. *Higher Education Quarterly, 71*(2), 159-181. https://doi.org/10.1111/hequ.12119

Nilsson, B. (2003). Internationalisation at home from a Swedish perspective: The case of Malmö. *Journal of Studies in International Education, 7*(1), 27-40. https://doi.org/10.1177/1028315302250178

Robson, S. (2017). Internationalization at home: Internationalizing the university experience of staff and students. *Educação, 40*(3), 368-374. https://doi.org/10.15448/1981-2582.2017.3.29012

Soulé, M. V., Parmaxi, A., & Nicolaou, A. (2025). Internationalization at home in higher education: A systematic review of teaching and learning practices. *Journal of Applied Research in Higher Education, 17*(7), 29-60. https://doi.org/10.1108/JARHE-10-2023-0484

UNESCO. (2019). *Global education monitoring report 2019: Migration, displacement and education.* France: UNESCO.

Wihlborg, M., & Robson, S. (2018). Internationalisation of higher education: drivers, rationales, priorities, values and impacts. *European Journal of Higher Education, 8*(1), 8-18. https://doi.org/10.1080/21568235.2017.1376696

Wijnen-Meijer, M. (2023). Educating doctors for the globalized era: The role of internationalization at home. *BMC Medical Education, 23*(1), 142.

Wu, J., Zhang, L., & Li, H. (2022). Internationalization at Home in medical and health education: A systematic review. *Medical Teacher, 44*(6), 639–649.