



The Importance of Interdisciplinary Studies and Implementing Virtual Co-teaching in Educational Institutions to Ensure Enhanced Student Learning at the National and International Level

(Interdisciplinary and Virtual Co-teaching Approaches at Institutions)

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Abstract

Educational institutions are places that are in constant search of approaches to equip students with the necessary skills for the contemporary world. Consequently, combining insights from different fields contributes a lot. The interdisciplinary approach allows educators to develop essential competence in students, giving them a comprehensive understanding of the field.

The article explores the benefits of interdisciplinary studies based on the case study. The study encompassed experimental groups, which were observed during the term. The detailed comparison of the Academic Performance of current and previous terms showed significant alterations in students' outcomes. The paper discusses the prospects for implementing co-teaching through Virtual collaboration among partner universities locally and internationally.

The paper demonstrates the advantages of interdisciplinary and virtual interdisciplinary co-teaching in terms of enhancing student motivation, developing critical thinking skills, and promoting the sharing of knowledge and expertise among partner universities, faculties, and professors. The possibilities for necessary moderation in educational programs and curricula. Nevertheless, the paper discusses the plausible complications of the approaches as well.

Keywords: co-teaching, collaboration, higher education, curriculum modification, student motivation

1. Introduction

In the era of globalization and technological revolution, the role of higher educational institutions is transforming. Utilizing conventional teaching methods makes the learning process monotonous. Consequently, educators are actively endeavoring to apply the engaging approaches in class (Dumbadze, 2025). Traditional, narrowly specialized approaches often no longer respond to the dynamic demands of the labour market and the complex challenges of the modern world, which require the synthesis of knowledge and skills across multiple disciplines. It is in this context that the importance of interdisciplinary learning increases.

Interdisciplinary learning involves integrating the knowledge, methodologies, and perspectives of two or more academic disciplines to explore a specific topic, issue, or problem (Repko & Szostak, Buchberger, 2019). Its goal is to develop essential skills in students, like a holistic perspective, critical thinking, problem-solving, and communication skills. This way, graduates are familiar with the fact that problems do not always fit in one specific field. One of the most successful ways of conducting interdisciplinary instruction is co-teaching, when two or more teachers plan, teach and assess a group of students (Friend & Cook, 2021). It is possible both within the representatives of the same and different disciplines, which is extremely beneficial for interdisciplinary teaching.

The development of digital technologies has added a new dimension to collaborative learning in the form of virtual collaborative learning. This involves the use of online platforms and tools by students and lecturers, regardless of geographical barriers, to implement joint learning activities. Co-teaching can be effectively implemented in a virtual format, allowing academic staff from different institutions (both national and international) to combine their expertise and offer students a unique learning experience.

The article aims to discuss the importance of interdisciplinary learning. The article aims to discuss the importance of interdisciplinary teaching based on concrete evidence obtained from a study conducted at three Georgian universities. This study shows how these approaches have a direct impact on educational outcomes, as reflected in significant improvements in students' motivation, critical thinking, problem-solving skills, and, most importantly, academic performance, as evidenced by assessment analysis. The authors have used the results of the experiments carried out among BSMA (Batumi State Maritime Academy) and BSU (Batumi Shota Rustaveli State University) groups to draw the conclusions. The work discusses the possibilities and prospects of implementing virtual interdisciplinary co-teaching based on the experiment of BAU (International University, Batumi) and BSMA cooperation in the field of teaching. The article considers applying the approach in higher educational institutions, including in the context of developing joint curricula.

1.1. Literature Review

The idea of interdisciplinary education has been appearing in educational literature for a long time. Researchers highlight the contribution of interdisciplinarity to the development of high-level cognitive skills in students, such as analysis, synthesis, and problem-solving requiring higher-order thinking. Interdisciplinary learning enables students to make connections across subjects and apply their knowledge to new non-standard situations (Lattuca & Stark, 2009). Therefore, it is reasonable to implement interdisciplinary education in universities as students

have to perform collaborative and integrated work, which is required in the modern work environment.

1.1.1. Co-teaching

Co-teaching as a teaching method has also been studied for many years. Research indicates that it increases the quality of teaching by integrating lecturers' abilities, contributes to professional development and is beneficial for students as they get a variety of teaching styles (Shaffer & Thomas-Brown, 2015). In interdisciplinary co-teaching, experts from different fields collaborate that enriches the learning process and provides students with a model of real scientific and professional collaboration (Nilsson & Kerin, 2022).

1.1.2. Virtual collaborative learning

Virtual collaborative learning is becoming increasingly relevant in the digital age. The research indicates that the use of technology in the learning process increases student engagement and motivation (Hartnett, 2016). Recent studies further highlight how emerging technologies, such as artificial intelligence (AI), are being integrated into collaborative learning models to make the learning process more personalized and effective. These approaches are particularly relevant in the digital age, where interdisciplinary learning supports the multifaceted development of students (Ivan & Zambori, 2024). Virtual platforms enable synchronous and asynchronous interaction, collaborative work on projects, and easy sharing of resources. Through virtual co-teaching, it is possible to involve lecturers from partner universities (both nationally and internationally) in the learning process. This gives students access to global knowledge and different cultural and academic perspectives (Howard, Ilyashenko & Jacobs, 2023). This particularly increases students' interest and enhances their motivation to learn. For professors, this represents an excellent opportunity to share their methodology, knowledge and experience with their colleagues, which contributes to their professional growth and strengthens institutional ties. Although favourable to the interdisciplinary and virtual co-teaching, the literature highlights the difficulties encountered in its implementation, such as curriculum integration, assessment methods, technology provision and adequate teacher training (Ivan & Zambori, 2024).

1.1.3. Methodology

The methods applied in this article include literature analysis, in particular, the analysis of literature on interdisciplinarity, co-teaching, and virtual collaboration; qualitative and quantitative data analysis were utilized to get a comprehensive understanding of the applied teaching approach, to highlight the advantages and disadvantages.

1.1.3.1. Sample and Data Collection

Questionnaires were applied through Google Forms to get a precise view of the situation. 25 professors took part in it. They filled in the questions that included open and closed ones. In-depth, in-person interviews among students and academic staff also conveyed the benefits of interdisciplinarity.

1.1.3.2. Analyzing of Data

The obtained data were analyzed by the head of the quality assurance service and by all the authors, which gave us a vivid view of the existing situations and necessary needs for alteration. Diagrams and tables are provided in the article based on the analysis of the results. For

quantitative data from the questionnaires, we used descriptive statistics to calculate frequencies and percentages, which are presented in graphs. Qualitative data from open-ended questions and in-depth interviews were analyzed using thematic analysis. During this process, the authors independently coded the interview transcripts to identify recurring themes and patterns related to the strengths and challenges of the approaches.

2. Findings/Results

2.1.Experiments and results: the case of BSMA, BSU and BAU groups

To explore the potential of interdisciplinary approaches and co-teaching, an experiment was conducted at the BSMA, BAU and BSU. The experiment aimed to examine the integration of different and related disciplines to assess the impact of this integration on the development of students' skills. The groups and related disciplines at BSMA and BSU were as follows:

- **Group 1:** Business English and Project Management. (BSMA)
- **Group 2:** English Language and Regional Studies. (BSU)
- **Group 3:** Operational Management and Project Management. (BSMA)

In each group, lecturers from the relevant disciplines collaborated in planning and implementing the learning process. This also means the creation of assignments/presentations/projects on the basis of common themes or topics for the two disciplines. Students were expected to combine knowledge and skills acquired in both fields. In the first group, students developed a project proposal (project management) and presented the project in accordance with business English standards. The integration of project management and business English within an interdisciplinary curriculum created a rich and practical educational experience that enabled the students to develop professional and language skills in a real work environment. The study deepened students' written and verbal communication skills and knowledge.

The second group prepared an analysis of a specific region (regional studies) and presented research in English. During the learning process, students studied specialized vocabulary related to regional studies in English. Special attention was paid to terms and concepts such as geopolitics, regional identity, cultural heritage, interethnic relations, and cross-border cooperation. Students conducted research on specific regions and prepared analytical materials in English.

The third group - During the learning process, students studied the basic principles of both project management and operational management and then applied this knowledge to practical assignments. Students developed process maps and resource allocation plans, simultaneously analyzing the project cycle and current operational activities. They used techniques and methods such as critical path method, workflow optimization, capacity planning, Gantt charts, responsibility matrix, and lean management - *critical path method, workflow optimization, capacity planning, Gantt charts, responsibility matrix and lean management*.

The evaluation was done both individually and in groups, using criteria developed by lecturers from both combined fields.

The following multiple skills were significantly developed according to the results of the experiment:

- **Integrated thinking:** It became possible to reveal connections between subjects and transfer the knowledge from one subject to another.

- **Problem solving:** Complex multidisciplinary tasks required finding non-standard solutions.
- **Communication:** Using the terminology, general communication skills were improved.
- **Teamwork:** skills of collaboration and taking responsibility were developed.
- **Project management skills:** In groups where project management was involved, students practiced planning, organizing, and controlling mechanisms.
- **Knowledge of subjects:** better assimilation and mastery of the subject were revealed due to the application of the knowledge in the practical integrated tasks.

Thus, the results show the efficiency of interdisciplinary co-teaching at the local level for developing students' multiple skills.

2.2. Interdisciplinary learning using co-teaching:

Advantages:

- **Deep learning:** Students see multiple aspects of a topic.
- **Stimulates critical thinking:** Reconciling different perspectives requires analysis and evaluation.
- **Real-world relevance:** Prepares students to solve complex problems.
- **Collaboration of lecturers:** Facilitates the sharing of knowledge and pedagogical experience.
- **Increased motivation:** A fresh and integrated approach is often more interesting for students.

Disadvantages & challenges:

- **Difficulty in coordination:** Lecturers need time and effort to agree on the curriculum, schedule and assessment requirements.
- **Difficulty of assessment:** It can be hard to fairly assess integrated knowledge and skills.
- **Resource requirements:** Needs to have administrative support and flexibility

2.3. Experiment on Virtual Learning between BSMA and BAU

Batumi International University (BAU) and Batumi State Maritime Academy (BSMA) jointly implemented a virtual, interdisciplinary learning project, the goal of which was to teach general Georgian language and basic medical terminology to foreign students seeking medical education in Georgia, so that they could receive medical education in Georgian. The project was implemented online and was based on the requirements stipulated in the Law on Education of Georgia and the internal regulations of the relevant universities. The project was approved as a pilot initiative by the Academic Council and Quality Assurance Office of BAU and BSMA.

The project involved: a Georgian language teacher from BSMA, who provided the general language teaching component; an English language teacher from BAU, who co-hosted the explanations and supported students in the transition from English to Georgian; BAU's Quality Assurance Service, which monitored the learning process, efficiency, and adherence to

academic standards, used the Zoom platform. The assessment included a formative, midterm, and final exam that met the criteria of the Quality Assurance Service.

- **Enhanced student motivation** — The project has raised the students' engagement and motivation levels.
- **Sharing experience amongst teachers** — The collaboration of the co-leading teachers functioned as a professional development opportunity and a chance to share each other's teaching practices.
- **Strengthening institutional collaboration** - BAU and BSMA have demonstrated that it is feasible and beneficial to share resources between two institutions of different academic profiles, which is a preliminary step in the development of other joint educational projects.
- **Developing digital/hybrid learning skills** — The students and the teachers have improved their digital communication and collaboration skills, which is an asset for the academic environment.

2.4. Analysis of the responses gained through our survey

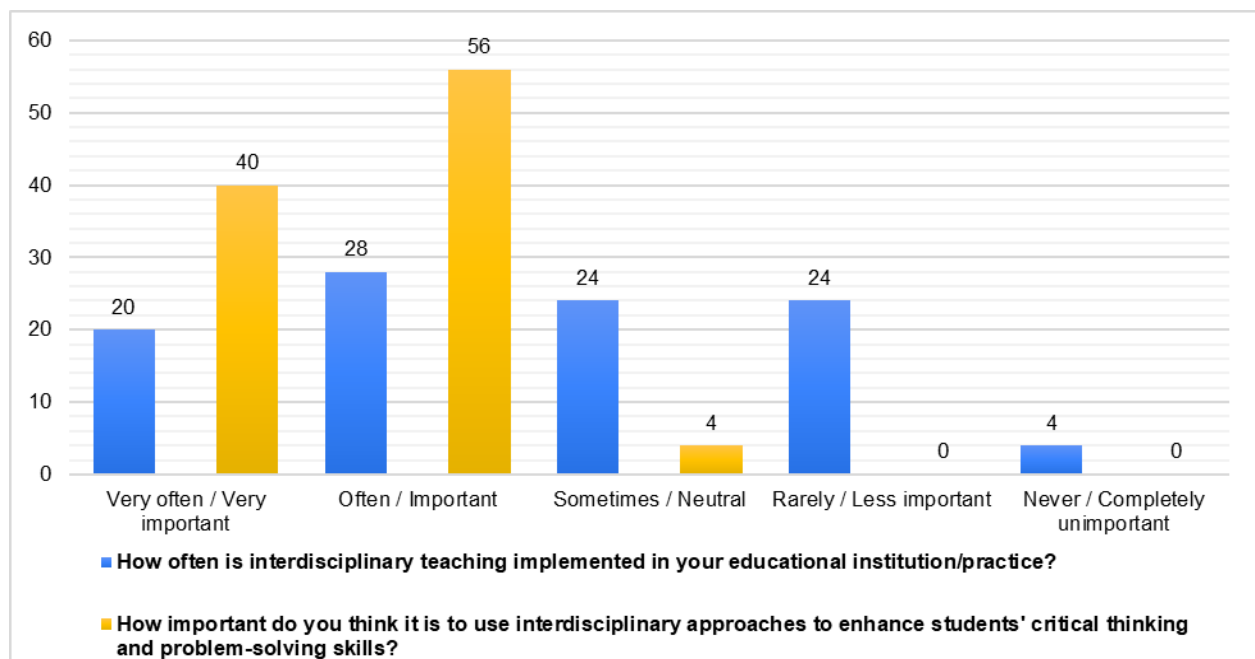
Interviews with 25 respondents revealed that interdisciplinary teaching significantly improves the quality of students' learning, increases their motivation and interest in subjects, and develops critical and holistic thinking. Respondents noted the importance of integrating interdisciplinary and virtual collaborative learning in the learning process.

Full information is available on the following link [[CLICK HERE](#)]

2.4.1. Questionnaire results

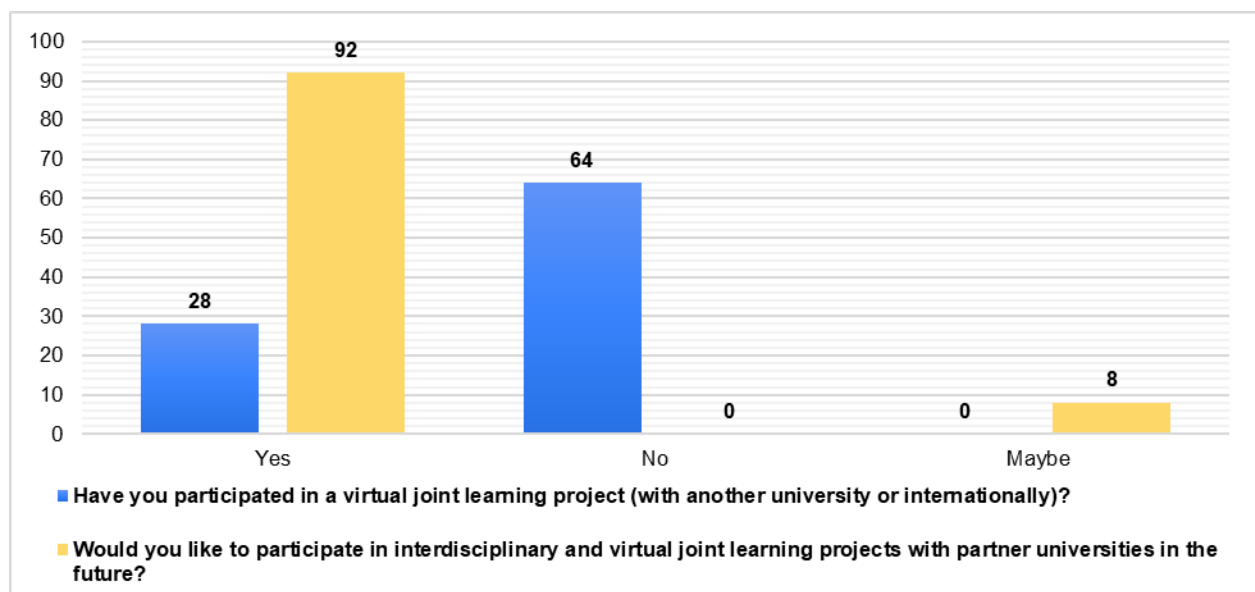
In Diagram N1, the results of the survey of 25 respondents are distributed as follows: most consider the use of interdisciplinary approaches to enhance critical and problem-solving skills to be very important (40%) or important (56%). At the same time, most of them note that interdisciplinary teaching is rarely, sometimes or often (24-28%) implemented in their educational institutions. Only a small proportion indicated that this approach was used very often (20%), while one respondent (4%) stated that they had never used it.

Diagram 1: Interdisciplinary teaching intensity & importance of interdisciplinary approaches for critical thinking and problem-solving skills (%)



Source: Analysis of primary results carried out by the authors. Batumi 2025

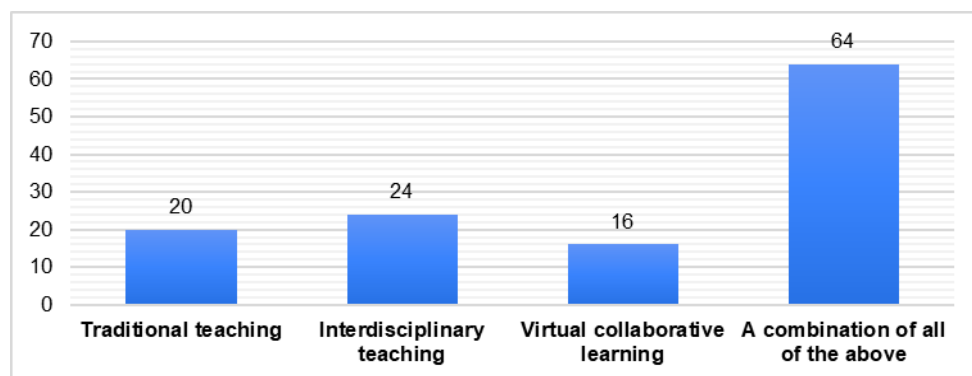
Diagram 2: Participated in virtual joint learning & willing to participate in interdisciplinary and virtual joint learning projects (%)



Source: Analysis of primary results carried out by the authors. Batumi 2025

In Diagram N2, 64% of respondents did not participate in the joint learning percentage, while 28% participated in various forms. 92% of respondents have a desire to engage and participate in the interdisciplinary learning process in the future, which is an indication that Academics recognize the importance of interdisciplinary learning and want to strengthen their courses in this direction. While 8% respond with Maybe when asked about engagement.

Diagram 3: The effective rate of student engagement and knowledge enhancement (%)



Source: Analysis of primary results carried out by the authors. Batumi 2025

Diagram N3 shows that most respondents (64%) believe that a combination of all the above formats (traditional, interdisciplinary, and virtual collaborative learning) is the most effective approach. More specifically, 24% consider interdisciplinary learning to be an effective approach, followed by traditional learning - 20% and virtual collaborative learning - 16%. Accordingly, most respondents prefer diverse teaching approaches that integrate teaching in different formats.

Table 1: Key challenges, solutions and benefits

The main question	Main findings
Benefits of implementing interdisciplinary teaching in terms of improving student learning within your field	• Deep understanding of complex issues; • Increased student motivation and active engagement; • Knowledge and experience gained from diverse perspectives; • Development of problem-solving skills; • Promoting creativity and innovation; • Improving teamwork and communication; • Better understanding and integration of professional areas;
Key challenges in organizing effective virtual collaborative learning projects (national or international) and ways to solve them	• Difficulties related to technological accessibility; • Language barriers and cultural differences; • Different time zones and coordination difficulties; • Low levels of student engagement and lack of motivation; • Methodological inconsistencies in teaching; • Lack of feedback and communication difficulties; • Challenges can be overcome with technological support, better understanding of directions, and teamwork;

Quality assurance of educational institutions for the integration of interdisciplinary and virtual collaborative learning	• Adapting curricula to support interdisciplinary approaches; • Improving technological platforms and ensuring student accessibility; • Strengthening international and local partnerships; • Integrate practical approaches to teaching; • Promote collaboration across disciplines; • Support personalized learning and analyze student needs;
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Source: Analysis of primary results carried out by the authors. Batumi 2025

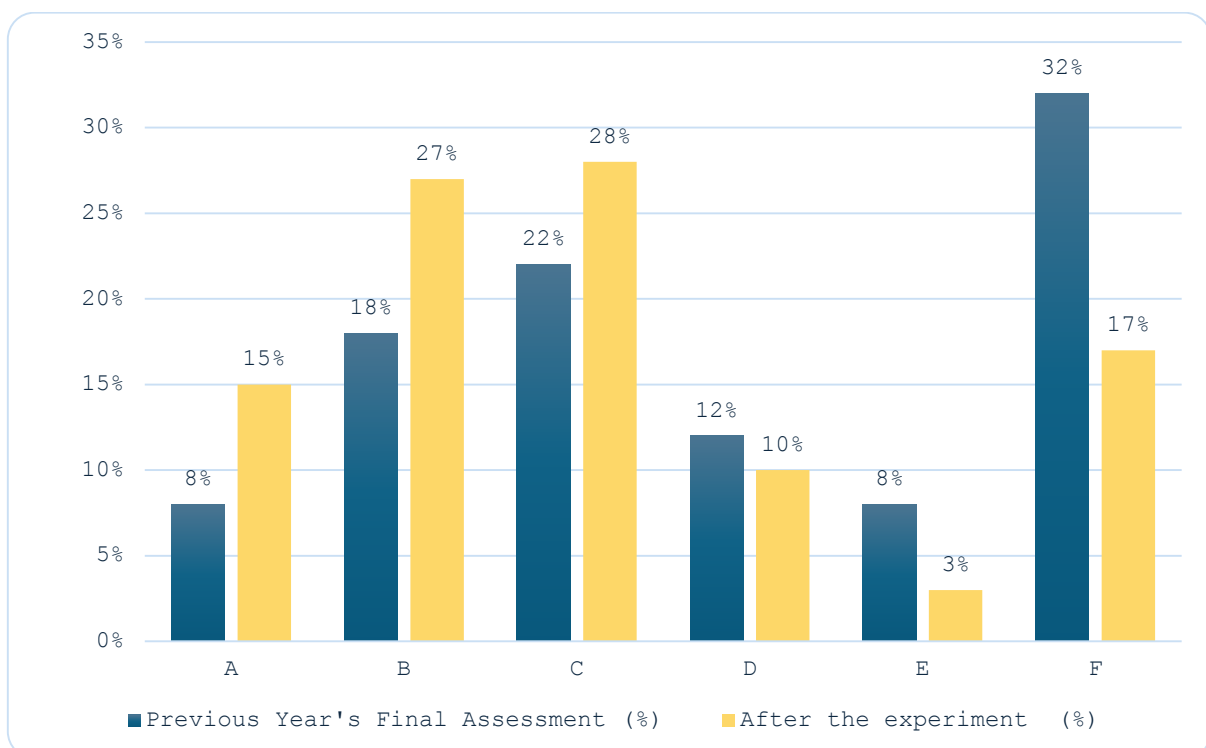
3. Interviews

In-depth paper-based interviews were conducted among all participating students and academic staff, analysis of which also conveyed the benefits and challenges of interdisciplinarity and virtual collaboration. The questionnaire included 16 questions (quantitative and qualitative) that were designed to get a thorough understanding of the applied teaching approach. The academic staff and participating students were interviewed after the term. The outcome of the interviews coincided with the outcomes of the Google Forms questionnaire and with the advantages and disadvantages given in the article, which ensured the transparency and validity of the results.

3.1. Analysis of the academic performance of the last five years

The Quality Assurance Service conducted an analysis assessing how the categorical distribution of student grades from A to F has changed based on the results of past years (the average of the last 5 years) and the current experimental semester.

Table 2: Categorical distribution of student ratings from 2020 to 2025 learning year. (% average across groups)



Source: Analysis of primary results carried out by the authors. Batumi 2025

Analysis of assessment categories revealed that the interdisciplinary and virtual learning approach had a positive impact on students' academic outcomes:

- The number of students in categories A and B doubled (from 26% to 44% in total), indicating an increase in achievement and a deeper understanding of the material.
- The percentage of students in category F fell dramatically – from 32% to 17%, which means that there was a reduction in failure and an increase in engagement.
- The drop in the number of students in categories E and D suggests that students who performed poorly were able to improve.
- The largest jump in scores was shown in the group that studied virtually, using an interdisciplinary approach and collaborating with faculty from other universities.

4. Discussion

The experiments conducted at three different universities reveal the significant pedagogical potential of interdisciplinary co-teaching. Based on the results, the prospects of virtual co-teaching can be discussed.

Perspectives for implementing virtual co-teaching in partner universities nationally and internationally:

Positive aspects:

- **Removal of geographical barriers** allows for cooperation between universities in different cities and countries.
- **Sharing expertise and experience from partner universities:** The virtual format allows professors from partner universities to share their unique knowledge, experience, and Teaching methods that enrich the learning process and promote the implementation of best practices.
- **Flexibility:** Asynchronous components allow for more flexible time management.
- **Technological skills development:** Students and lecturers master modern digital tools.
- **Increasing motivation through technology and partners:** Interactive online tools and the involvement of lecturers from partner universities (demonstrating their expertise) significantly increase students' interest and desire to learn.
- **Internationalization without mobility:** gaining international academic and cultural experience without physical mobility.
- **Chances of getting dual diplomas.**

Challenges:

- **Technical challenges:** unequal access to the Internet and devices; different levels of digital literacy.
- **Maintaining engagement:** keeping students engaged and interacting in a virtual space requires particular pedagogical approaches.
- **Time zones:** difficulties in organizing synchronous activities in international cooperation.

- **Institutional coordination:** compatibility of technical platforms, agreement on administrative procedures.

4.1. Joint Curriculum Development/Modification

The analysis of the groups of the BSMA and BSU experiments and the prospects for virtual co-teaching indicate the feasibility of developing joint curricula or modifying existing ones between one or two institutions. This could include:

1. **Introducing changes to the programs:** Integrating interdisciplinary modules into existing curricula, where lecturers from different disciplines (potentially from a partner university virtually) teach together.
2. **Adding joint disciplines:** Creating new, fully integrated courses that are designed from the start for co-learning and an interdisciplinary approach. For example, a course on "Digital Marketing and Data Analysis" or "Environmental Policy and Economics."
3. **Development of a joint educational program:** the creation of a completely new, joint educational program by two or more universities (at the national or international level), which envisages interdisciplinary co-teaching with the active use of virtual components. This may include the award of a double diploma.

The process requires:

- Identification of partner institution(s) with common interests and compatible programmes.
- Specification of learning objectives and learning outcomes.
- Joint design of curriculum, syllabi, teaching approaches and assessment strategies.
- Joint development of methods and assessment systems.
- Resolution of related administrative and technical issues (credits, tuition, platform compatibility, data protection).
- Lecturer training.

Besides the positive results, some limitations can be noted. First, the experiment was relatively small in scale, as we only included specific groups from three universities in one semester. This, in turn, may limit the generalizability of our findings to other universities or the broader student environment. The experiment cannot give us the long-term influence of the approaches on the academic performance of students, as it was conducted over a short period of time. We also did not control for factors such as individual student differences, specific subject characteristics, or teacher teaching styles that could influence the final results. Third, although we analyzed the technical challenges, we did not conduct an in-depth study of the administrative and political barriers that may be required to implement these initiatives on a large scale. These factors limit the generalizability of the results and require further studies that include a larger and more diverse experiment, as well as follow-up with students over a longer period of time.

The discussion leads us to conclude that interdisciplinary co-teaching can be reinforced by virtual collaboration and should be discussed as an essential strategy at higher educational institutions. It responds to contemporary demands and provides a dynamic, flexible and efficient educational ecosystem.

5. Conclusion

Interdisciplinary teaching and co-teaching are powerful tools for improving the quality of higher education and preparing students for the complex challenges of the modern world. The experiments of BSMA, BSU & BAU groups have shown that such an approach can significantly develop students' integrated thinking, problem-solving, communication, and collaboration skills.

Integrating virtual collaboration into co-learning opens up new opportunities, allowing for the ability to overcome geographical and institutional boundaries, attract international expertise, and increase student motivation through technology and partner engagement. The point of particular note is the opportunity to share the expertise of professors from partner universities, their unique knowledge, experience, and teaching methods, which enriches both the students' and professors' perspectives. It also leverages the experience of local lecturers and promotes the implementation of best practices at the national and international levels.

Although there are challenges in terms of coordination, assessment, and technological provision, the potential benefits of virtual interdisciplinary co-teaching significantly outweigh the difficulties. Educational institutions should consider implementing these approaches, including through the development and modification of joint curricula, to ensure that future generations are equipped with the knowledge and skills necessary for success in the 21st century.

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