

WORTH EVERY PENNY: THE INVALUABLE RETURNS OF INVESTING IN INTERCULTURAL AND INTERDISCIPLINARY PROJECT-BASED LEARNING IN HIGHER EDUCATION

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Abstract

When organizing intercultural and interdisciplinary Project-Based Learning (PBL) activities across Higher Education Institutions (HEIs), the organizational and resource implications, along with the associated financial challenges, soon become crucial. Even promising approaches may not take off as a simple 'return on investment' view and funding decision may not fully address their various impacts on students, staff, institutions and society.

This paper explores the experiences within a distributed interdisciplinary project-based learning program run from 2020 to 2023 and involving more than 150 students from four continents learning 21st century skills by collaborating over one semester to address real-world problems faced by clients in partner countries. While the primary goal of this distributed interdisciplinary and intercultural project-based learning program was to offer students a truly Global Intercultural Project Experience (GIPE), this paper explores its broader impact. We found that the program significantly influenced both the academic and administrative staff at all partner universities. Furthermore, we examine the program's effect on the participating institutions themselves over the four-year period. Our conclusion is that the invaluable benefits of such interdisciplinary project-based learning extend well beyond financial metrics. They include enhanced student learning experiences, strengthened cooperation and mutual learning between academics and administrative staff, improved institutional reputation, and positive societal impact.

Thus, we worked hard to convince both our university management and the world's largest funding organisation for the international exchange of students and researchers to grant financial support for another 3-year period in 2025 to 2027 during which the GIPE concept will be further developed and a permanent organizational structure shall be established based on an extended network of partner institutions and sponsors around the world.

Keywords: Project-based Learning, Collaborative Online International Learning, Intercultural Collaboration, Interdisciplinary Students Project.

1 INTRODUCTION

Globalization necessitates that Higher Education Institutions rapidly adjust their approaches to equip students with the essential skills and knowledge required to succeed in the 21st century. As economies and societies become more interconnected, the workforce faces complex global challenges that demand not only technological expertise but also critical thinking, adaptability, and cross-cultural communication skills [1].

In the dynamic landscape of higher education, traditional lecture-based methods are increasingly being supplemented or replaced by more interactive, student-centered approaches. Among these, Project-Based Learning (PBL) stands out as an especially effective pedagogical strategy that emphasizes experiential learning through real-world challenges [2]. This approach encourages students to actively engage in projects that mirror authentic professional scenarios, fostering a deeper understanding and practical application of knowledge [3]. PBL not only equips students with critical thinking, problem-solving, and collaborative skills but also prepares them for the complexities of the modern workplace [4].

In today's increasingly interconnected world, complex global challenges - such as climate change, public health, and technological innovation - cannot be addressed within the confines of a single discipline or cultural perspective. Instead, these issues require collaborative efforts that transcend traditional boundaries. Warr and West [5] highlight intercultural and interdisciplinary project-based learning (IPBL) as a crucial educational approach to meet these needs. IPBL supports an interdisciplinary method for solving real-world problems and cultivates an intercultural environment that promotes understanding, respect, and effective communication among diverse cultural groups [6]. By engaging in IPBL, students gain valuable experience working within diverse teams, learning to navigate cultural nuances and leverage varied expertise, ultimately fostering creativity and innovation. This approach not only

enhances their academic and professional skills but also prepares them to become global citizens equipped to tackle pressing international issues with empathy and insight.

2 RELATED WORK

2.1 Interdisciplinary Project-Based Learning

Several notable studies and initiatives underscore the significant impact of interdisciplinary project-based learning (IPBL) within intercultural contexts. These works emphasize the critical value of integrating diverse perspectives and disciplines to address complex global challenges, illustrating how these educational approaches effectively prepare students to navigate and tackle such issues.

Hart [7] explores the role of IPBL in enhancing students' intercultural competence through engagement in diverse teams. This study highlights the importance of reflective practice and structured interaction as pivotal in developing the ability to understand and appreciate cultural differences. The findings indicate that PBL environments, where students tackle real-world issues from multiple disciplinary angles, can substantially enrich both their intercultural skills and academic learning. By confronting and navigating cultural differences, students gain a broader mindset necessary for today's workforce.

Oladiran, Uziak, Eisenberg, and Scheffer [8] examine the Global Engineering Teams (GET) program, which facilitates project-oriented tasks in virtual student teams, collaborating with industry partners. Participants from various countries and disciplines work together on engineering design projects, demonstrating how technology enables international student collaboration. This setup allows them to apply their diverse knowledge and cultural insights to devise innovative solutions. The GET program further illustrates how such collaborations necessitate the development of digital literacy and communication skills, which are essential in a globalized economy.

The UNESCO Chair in Problem-Based Learning (UCPBL) at Aalborg University, established in 2007, represents a dedicated effort to advance PBL in engineering education across diverse cultural settings. This initiative focuses on developing pedagogical frameworks and resources that support the implementation of PBL in ways that foster intercultural exchange and understanding. By prioritizing these educational innovations, UCPBL also contributes to creating inclusive learning environments that appreciate and capitalize on cultural diversity.

Focusing on sustainability challenges, Sulkowski, Kowalczyk, Ahrendsen, Kowalski, and Majewski [9] highlight a program where students from various disciplines and countries collaborate on projects promoting sustainable development. This initiative demonstrates how integrating PBL with an intercultural and interdisciplinary focus can lead to innovative sustainability solutions. It encourages students to critically engage with environmental, economic, and social issues from a global viewpoint, equipping them with the tools to develop practical approaches to global sustainability challenges.

Collectively, these related works underscore the effectiveness of interdisciplinary problem-based learning in fostering academic growth, intercultural competence, and collaborative skills [10]. They showcase how bringing together students from different backgrounds and disciplines to work on real-world problems can create rich, transformative learning experiences, preparing them for the complexities of the modern world. However, as Saubert and Cooper [11] note, there is a scarcity of research on how IPBL in international and intercultural contexts benefits academic and administrative staff or the higher education institutions involved. Studies like [12] and [13] hint at this potential, suggesting an avenue for future exploration. Understanding the broader institutional impacts of IPBL could lead to more holistic adoption and refinement, benefiting not just students but the entirety of the educational ecosystem.

2.2 Collaborative Online International Learning

Collaborative Online International Learning (COIL) and virtual exchange programs have become increasingly prominent in higher education as innovative approaches to fostering global engagement and intercultural competence among students [14]. Numerous studies, e.g. by Rubin [15], highlight the effectiveness of COIL in bridging geographical and cultural divides by facilitating cross-border collaboration between students and faculty from diverse institutions. One notable benefit of COIL is its ability to provide students with an accessible platform to engage in meaningful intercultural interactions without the need for physical travel, thus making global learning experiences more equitable and inclusive. Through virtual teamwork, students enhance their digital literacy, communication, and problem-solving skills while gaining valuable international perspectives that prepare them for the global workforce.

Institutions also reap significant advantages from implementing COIL programs. They can expand their global networks and partnerships, enriching their educational offerings and enhancing their international reputation. By integrating COIL into their curricula, institutions demonstrate a commitment to innovative teaching practices and global education, which can attract a diverse body of students and faculty. Moreover, COIL facilitates professional development opportunities for faculty, encouraging collaborative research and teaching practices across cultural contexts. Overall, COIL and virtual exchange provide a dynamic framework for students and institutions to engage in meaningful global learning, fostering an environment of mutual understanding and cultural awareness.

3 THE GLOBAL INTERCULTURAL PROJECT EXPERIENCE FRAMEWORK

In an effort to strengthen internationalization efforts at German Universities of Applied Sciences, the German Academic Exchange Service (DAAD) awarded a four year (2020-2023) funding for the GIPE framework program offering selected students from participating institutions in Germany (Westfälische Hochschule), Indonesia (Atma Jaya Catholic University of Indonesia, Jakarta), Namibia (Namibia University of Science and Technology, Windhoek), and Peru (Universidad Católica San Pablo, Arequipa) the opportunity to gain a truly Global Intercultural Project Experience (GIPE) by working in multicultural teams on international and interdisciplinary projects [16]. Students collaborated over a semester to address real-world problems faced by clients in partner countries. Over this period, more than 150 students participated, with 116 awarded scholarships for international mobility. Guided by academics from all partner universities, the students successfully completed each project, expressing profound appreciation for the learning experiences while navigating the challenges of working across different time zones, cultures, evolving requirements, and technical issues.

3.1 Project Overview

The annual student projects took place from February to June/July (subject to different academic calendars and lecturing periods) proceeded by client and project selection, evaluation of students' applications and awarding scholarships as well as requirements gathering and detailed project planning together with the selected client. They were run in four phases (see Figure 1):

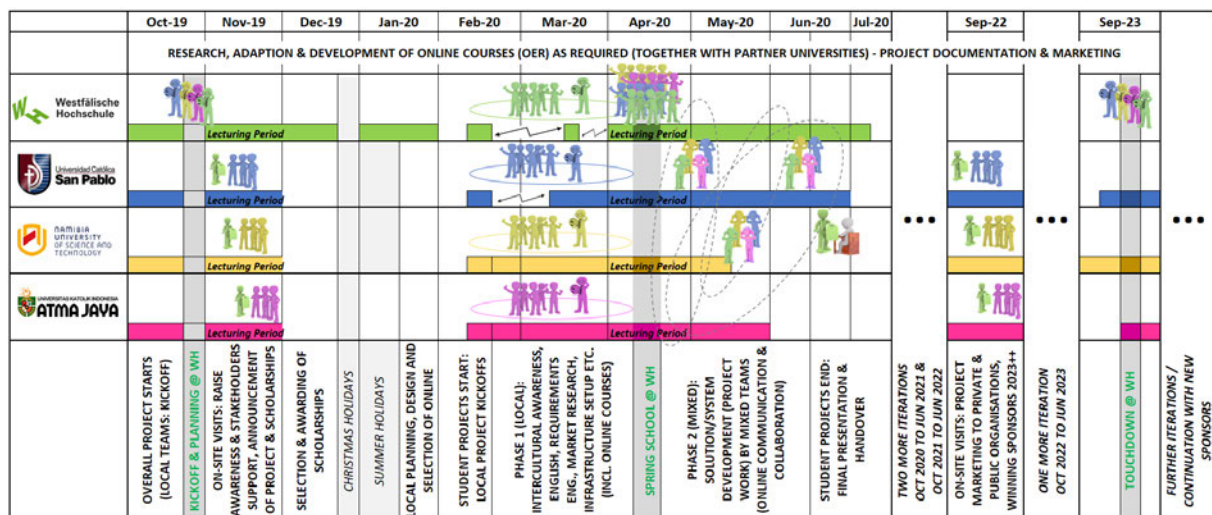


Figure 1. The Masterplan for the GIPE Framework 2019-2023.

- On-line collaboration preparation: A virtual global kick-off event brings all stakeholders together. Students then get prepared for the various project tasks through targeted trainings. Students join the project in intervals depending on the home universities lecturing schedules.
- Two-week face-to-face phase: All participating students and one representative lecturer from each university meet in Germany for team-building, intercultural exposure and mixed-team-setup ('Spring School').
- On-line collaboration: the students continue working on their project tasks in mixed teams using various on-line collaboration tools. They are instructed ('guided') by academic staff from all partner institutions and different disciplines, e.g. in the 2021 project, a business sub-project ('stream') was

guided by a lecturer/researcher team from Peru and Indonesia while another stream focusing on the developing of an educational adventure game was guided by a German academic together with a colleague from Namibia.

- One-week project-touchdown and hand-over: The German students travel to the client situated in Namibia, Peru or Indonesia (alternating) offering true international exposure.

Due to travel restrictions during the COVID-19 pandemic, the 2020 students project was held entirely online ('pure COIL') while in 2021 at least the hand-over to the client in Indonesia could take place later the year and with only a few students travelling. Nevertheless, even without any meeting in person, both student projects were completed successfully and the results appreciated by the respective clients. However, in [17] we explicitly discuss the importance of physical meetings during the two-week Spring School which is essential for our approach.

3.2 Impact on Students

Summarizing from the students' perspective, the Global Intercultural Project Experience (GIPE) was enriching in many ways: culturally, academically, and professionally. Reviewing the sentiments expressed by the students confirms observations made by the guides, that though the students experienced many new challenges they equally appreciated the learning and the multicultural context. Working in an interdisciplinary team on a project for a real client required a steep learning curve in a short time. The students received structured technical training and were exposed to new tools and techniques, and learned good project management practices using professional tools. GIPE thus exhibits similar impact on the participating students as observed by other researchers before, e.g. [7]. Student engagement was significantly enhanced as students are actively involved in the learning process. By working on projects that are meaningful and relevant to their interests, students are more likely to find the material and tasks engaging and motivating. This increased engagement not only makes the learning experience more enjoyable but also improves retention and comprehension of the material.

The IPBL approach underlying GIPE has also shown to be particularly effective in fostering critical thinking and problem-solving skills. As students were presented with complex, real-world problems that do not have straightforward solutions, this required them to think critically, analyse various aspects of the problem, and devise innovative solutions. To succeed, students must integrate knowledge from multiple disciplines, evaluate different design options, and consider practical constraints such as cost and materials. This process mirrors real-world engineering challenges, thereby equipping students with the skills necessary to tackle similar problems in their professional careers.

Another significant impact we have observed is the development of collaboration and communication skills as students have to work together to achieve common goals. This collaborative approach helps students develop essential teamwork skills, such as effective communication, conflict resolution, and the ability to work with diverse groups of people, especially in the intercultural GIPE setup. Our findings confirm earlier research, e.g. by Hmelo-Silver [18], indicating that students who engage in PBL demonstrate improved interpersonal skills, showed greater proficiency in collaborative problem-solving and were better at articulating their ideas compared to those in traditional learning environments. These skills are invaluable in the modern workforce, where teamwork and communication are often key to success.

Furthermore, GIPE encourages self-directed learning and autonomy requiring students to take greater responsibility for their own learning. They must manage their time, set goals, conduct research, and make decisions about how to proceed with their projects. This increased autonomy helps students develop important self-management skills, such as time management, and independent problem-solving.

3.3 Impact on Academic and Administrative Staff

Intercultural and interdisciplinary project-based learning (IPBL) within higher education institutions as implemented in GIPE poses significant challenges but also opportunities not only to students but also to the academic and administrative staff at participating higher education institutions.

For academic staff, engaging in IPBL can lead to professional growth by encouraging the development of new pedagogical skills and the use of innovative teaching methods that integrate diverse cultural and disciplinary perspectives. It allows educators to collaborate across fields, enhancing their own understanding of interdisciplinary approaches and enriching their research and teaching portfolios. Additionally, IPBL environments foster continuous learning and adaptation as faculty members interact with international colleagues and students, broadening their global awareness and intercultural competence.

Academic staff must often venture beyond their traditional disciplinary boundaries, necessitating a proactive engagement with unfamiliar content, teaching methods and rubrics, which stimulates professional growth but also demands substantial adaptability and commitment to interdisciplinary collaboration. The cooperation of academics from different continents when guiding and finally also grading the students, resulted in further and deeper cooperation, joint research and publications lasting much beyond the individual projects.

For administrative staff, supporting IPBL initiatives can improve institutional processes and policies by encouraging a more agile and collaborative operational structure. Engaging with diverse student teams and international partnerships enhances their ability to manage cross-cultural communication and coordination, vital skills in today's global academic environment. Moreover, the successful implementation of IPBL projects can elevate the institution's reputation, attract global partnerships, and increase student enrolment by showcasing a commitment to innovative and inclusive education.

The adoption of IPBL requires the development of new frameworks for curriculum design, assessment, and resource allocation, pushing staff to innovate and potentially reconfigure institutional policies and practices to support these holistic education models. Ultimately, while IPBL may burden staff with initial hurdles, it also promotes a dynamic educational environment that encourages continuous learning, adaptability, and innovation, potentially leading to enhanced job satisfaction and a more cohesive institutional culture.

3.4 Impact on Higher Education Institutions

IPBL within higher education institutions as implemented in GIPE is a transformative approach that fosters collaboration across various disciplines and cultures, enriching the educational experience not only for the students but everyone involved.

Having students from around the world on the campus for two weeks at the 'Spring School' and inviting local students to join in for some open sessions and social events offered a low-threshold international and intercultural experience for all, helped promoting internationalization and exchange and finally led to an increased interest in student exchanges not only to the participating partner universities. As higher education continues to evolve, integrating PBL into the curriculum can not only provide a more enriching, relevant, and effective learning experience for students and staff. It can also contribute to the profile of the institution and result in a competitive advantage when attracting the best students and also staff.

Consequently, intercultural and interdisciplinary student projects as in GIPE that incorporate both online (COIL) and on-site collaboration at 'Spring School' and 'Hand-Over' offer comprehensive benefits to higher education institutions as a whole. These projects serve as a catalyst for institutional growth and innovation by integrating global perspectives into the educational fabric, thereby enhancing the academic rigor and relevance of the institution's programs. For faculty, these initiatives provide opportunities for cross-disciplinary teaching and research collaborations, fostering an environment of continuous professional development and academic excellence. Such collaborations often lead to new research insights and innovative teaching methods that can be shared across departments, enhancing the overall educational quality.

Administratively, these projects necessitate the development of robust support systems and infrastructure that improve the institution's capability to manage complex international collaborations. This development often results in more efficient operational processes and better use of digital tools for communication and project management, which can be applied across various institutional functions. Furthermore, the successful implementation of these projects enhances the institution's reputation, making it more attractive to prospective students, faculty, and international partners. Engaging in these global endeavours illustrates a commitment to fostering diversity, cultural competence, and collaborative innovation, qualities that are increasingly valued in today's educational landscape. Overall, the entire institution benefits by becoming more adaptable, globally connected, and forward-thinking, positioning itself as a leader in modern education.

3.5 Impact on Society

Finally, intercultural and interdisciplinary project-based learning across higher education institutions profoundly impacts not only the institutions themselves but also society at large. For the institutions, such programs promote a culture of collaboration and innovation, breaking down traditional silos and encouraging faculties to work together across disciplines and borders. This leads to enriched curricula, more comprehensive research capabilities, and enhanced institutional reputation as leaders in global

education. Moreover, involvement in these collaborative projects allows institutions to build strong international networks, facilitating student and faculty exchanges, and knowledge sharing that are invaluable in a globalized academic landscape.

From a societal perspective, these programs produce graduates who are well-equipped to address complex global challenges. As students from diverse cultural and academic backgrounds collaborate, they develop a deep understanding of global issues and a heightened awareness of cultural sensitivities. This prepares them to contribute meaningfully to multicultural teams in various industries, driving innovation and fostering inclusive growth. Furthermore, the real-world problems tackled through these projects often have direct societal benefits, as solutions developed can be implemented to improve communities in various parts of the world. Ultimately, intercultural and interdisciplinary project-based learning acts as a catalyst for positive change, creating a ripple effect that extends beyond educational institutions into the broader global society.

4 TOWARDS SUSTAINING INTERCULTURAL PROJECT-BASED LEARNING

Having identified the various positive impacts of our GIPE approach on students, staff and the HEIs involved, it has become clear that IPBL should become an integral approach becoming part of the academic offering of any HEI. Therefore, permanent structures need to be established and organizational as well as financial support needs to be ensured independent from short or mid-term project funding.

Having properly evaluated the GIPE approach that has been run in 2020 to 2023, we not only identified its strengths as discussed before, but also observed some potential improvements e.g. addressing university management concerns about the 'return on invest' when focus is only on number of students benefitting from GIPE. Thus, together with our partner universities supporting GIPE from the very beginning, we further developed the GIPE concept towards GIPE++ by strengthening the projects' focus on UN-SDGs with inclusive and sustainable project organization and establishing a flexible network structure of academic and sponsoring partners ensuring sustaining support from inside and outside the HEIs involved. With the new project funding put into perspective by DAAD again for the years 2025 to 2027, we shall also emphasize on the academic validation of our IPBL implementation and share and discuss results with researchers and practitioners in the field at a dedicated conference in 2026.

5 CONCLUSIONS

Interdisciplinary learning, particularly in the form of project-based learning as established in GIPE, equips students with the critical skills needed for success in the modern global and integrated business environment. By engaging in projects that span multiple disciplines, students learn to approach problems from diverse perspectives, fostering innovative thinking and collaborative problem-solving abilities. This method mirrors the complexities of real-world business scenarios, where solutions often require input from various domains. Moreover, project-based learning emphasizes teamwork and communication skills, as students must coordinate with peers who may have different expertise and cultural backgrounds. This experience is invaluable in preparing students to work effectively across global teams. Additionally, by tackling practical projects, students develop a strong sense of initiative and adaptability, essential traits in navigating the dynamic and interconnected landscape of today's global economy. Overall, interdisciplinary project-based learning not only enhances technical and cognitive skills but also cultivates a mindset that is agile, inclusive, and collaborative, making students highly adept for the demands of the new business world.

ACKNOWLEDGEMENTS

The GIPE Project was funded by the German Federal Ministry for Education and Research (BMBF) through the German Academic Exchange Service (DAAD) under grant no. 57510482.

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