

## Chapter #15

### GLOBAL INTERCULTURAL PROJECT EXPERIENCE (GIPE): A Distributed Interdisciplinary Project-Based Learning Framework

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#### ABSTRACT

This chapter describes a new concept and experiences of a distributed interdisciplinary learning program for students across continents. The aim is to provide students with a truly Global Intercultural Project Experience (GIPE) by working together with peers from around the world and solving real-life client's problems. We have received seed-funding for four annual projects to engage students from Germany (Europe), Namibia (Africa), Indonesia (Asia), and Peru (South America). In 2020 and 2021, 28 and 44 students from four continents engaged in a one-semester distributed interdisciplinary project for a Namibian and Indonesian client, respectively. Despite Covid-19 they successfully completed the project expressing deep appreciation for the learning opportunities overcoming challenges of working across widespread time zones, cultures, changing requirements, and various technical difficulties. Considering the vast learning benefits, we suggest incorporating such projects in all tertiary education curricula across the globe, while streamlining organizational efforts based on lessons learned.

*Keywords:* project-based learning, collaborative online international learning (COIL), distributed software development, intercultural collaboration, interdisciplinary students project.

#### 1. INTRODUCTION

Globalization requires Higher Education Institutions (HEIs) to provide relevant 21st century skills and knowledge. The ongoing pandemic has fast-tracked a long-awaited educational transformation promoting distributed online learning. Although the idea and successful application of distributed student projects with online collaboration among different HEIs dates back to the late 1990s (Brereton, Gumbley, & Lees, 1998), the focus on international and intercultural aspects only appeared during the last decade (Appiah-Kubi & Annan, 2020). Collaborative Online International Learning (COIL) receives growing interest as an innovative, cost-effective instructional method that promotes intercultural learning through online collaboration between faculty and students residing in different countries or locations within the context of a course (DePaul University, 2017). Moreover, Project-Based Learning (PBL) is a well-established student-centered approach leading to the acquisition of deeper knowledge through active exploration of real-world challenges and problems (Bender, 2012).

Thus, in this paper we present the GIPE project, which builds on PBL and COIL as a hybrid realization with a short-term physical mobility phase to provide students with highly competitive skills for working in an international, intercultural and interdisciplinary team, while jointly working on one real-life project with a local client. In this chapter we share the GIPE realization and experiences from two concluded project cycles. We discuss necessary student support, organizational issues as well as the impact of Covid-19.

## **2. RELATED WORK**

With an increasing digitalization of education and limitations of mobility the concept of “Internationalization at Home” has gained momentum (Mudiamu, 2020). COIL offers students “an inclusive, international learning opportunity for students and staff who may not be able to or want to have a physical or blended mobility” (Helm & O’Dowd, 2020, p. 3). COIL courses usually entail shared teaching by staff from different institutes and countries; with students from both countries using a problem-based learning approach with local learning outcomes, assessments, and communication tools (De Castro, Dyba, Cortez, & Pe Benito, 2018). The benefits of using COIL courses have been widely recognized (Almeida, Robson, Morosini, & Baranzelil, 2018; Barbosa, Santos, & Prado-Meza, 2020; Duffy, Stone, Townsend, & Cathey, 2020; Mudiamu, 2020). 23 COIL experiences analyzed by (Hildeblando Junior & Finardi, 2018), showed that learners developed intercultural competencies, digital skills, international education experience, and global awareness. A number of Universities have meanwhile implemented the COIL approach with varying levels of complexity. Rauer, Kroiss, Kryvinska, Engelhardt-Nowitzki, and Aburaia (2021) presents a telecooperative Global Virtual teams project concept, which can be adapted to different study programmes. The authors ran a pilot study with 150 students from 5 different universities and different disciplines working on simulated business tasks. Challenges perceived by participants were mostly related to communication and language, lack of subject specific knowledge and coordination, while the entire project experience was rated as valuable by most students (Rauer et al. 2021). Multicultural communication project environments are complex and demand awareness of cultural variations (Ochieng & Price, 2010). However, bibliometric review of research on communication in virtual teams by (Muszyńska, 2021) show that issues linking communication with trust and leadership are least explored areas. As echoed by (Ochieng & Price, 2010), creation and development of effective cross-cultural collectivism, trust, communication, and empathy in leadership is an important ingredient for remote project collaborations success.

## **3. GIPE REALIZATION**

### **3.1. Background**

A quadrilateral partnership was conceptualized, building on long-term individual staff and institutional bilateral collaborations of the Westfälische Hochschule (WH) with its partner universities in Namibia, Indonesia and Peru. The proposed program was modelled on previous successfully completed bilateral student software development projects engaging German and Namibian students in real client projects. Concerned with providing equal learning and traveling opportunities for all students and operating within funding options the program incorporates traveling for all students; turn-taking client selections from the partner countries with an emphasis on interdisciplinary projects. The program offers selected students the opportunity to gain a truly Global Intercultural Project Experience (GIPE) by

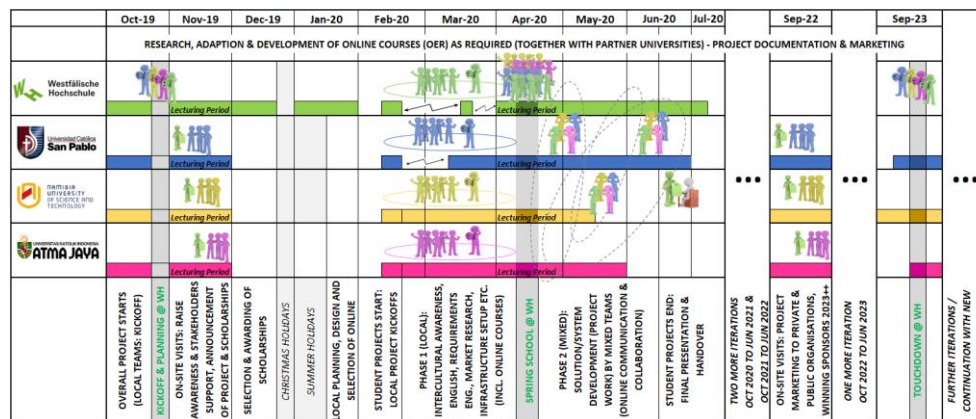
working in a multicultural team on an international project. The main objective of GIPE is to provide students with state-of-the art knowledge and skills while working in a distributed multicultural and multidisciplinary team across continents. GIPE also aims at strengthening the collaboration among its partner universities and promoting intercultural exposure in general through ‘internationalization@home’ activities.

### 3.2. The overall framework

In an effort to strengthen internationalization efforts at German Universities of Applied Sciences, the GIPE framework program received a four-year (2019-2023) funding. In the beginning representatives of all four Universities congregated in Germany to plan the implementation of the framework. A German representative then visited all partner Universities promoting GIPE at management level to ensure institutional commitment and support.

At the core of the GIPE framework are the annual student projects taking place from February to June/July (subject to different academic calendars and lecturing periods) preceded by a 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 (see Figure 1).

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



The annual projects consist of four phases:

1. Online collaboration preparation: A virtual global kick-off event brings all stakeholders together. Students then get prepared for the various project tasks through targeted training. Students join the project in intervals depending on the home universities’ lecturing schedules.
2. 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’).
3. Online collaboration: The students continue working on their project tasks in mixed teams using various online collaboration tools.
4. One-week project-touchdown and hand-over: The German students travel to the client situated in one of the partner countries.

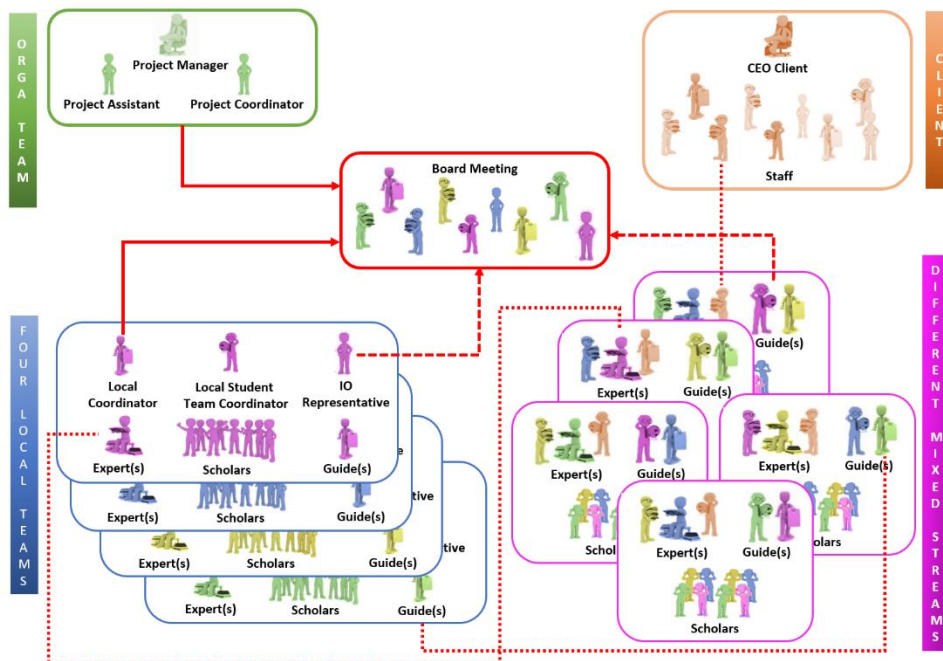
### 3.3. Operationalization of the GIPE Projects

The operationalization is based on a rigorous definition of participants' roles and communication (infra)structures. The 2020 and 2021 projects were of varying complexity and took place entirely remotely due to the Covid-19 situation.

The Project Manager (PM) and Project Coordinator (PC) are responsible for strategic and operational tasks as per funding agreement. Each University appoints a Local Coordinator (LCs) and International Office Representative (IOR) to organize scholarships and team-building, Guides (Stream Coordinators, SC) being faculty content experts, a Stream Lead (SL, one person from this circle) as well as experts, sponsors and external stakeholders and contact persons of the client. It is possible to fill several roles at the same time, for example LC, SC and SL. The number of SC depends on the complexity and number of streams of a project.

The allocation of students to teams is based on their country (mixed teams), their prior skills, and their interest. The students fill in a skill competency survey based on competencies needed for successful project completion. The survey also allows the PC to identify missing skills to plan interventions. Each SC provides performance feedback on each student's contribution to the success of the project. Each University applied its own assessment and grading system. Student feedback is provided voluntarily in the form of videos or text at the end of the project, and formal challenges and reflections from the individual student progress reports by the Namibian students.

Figure 2.  
The Roles within GIPE.



Day-to-day business is based on regular, synchronous project meetings via video conferencing systems. There are a number of regular operational and project-related meetings – starting mostly at 12:00 UTC, the only time accommodating the four time zones. Board meetings (BM) are held fortnightly to discuss general information and decide on common issues (Participants: PM, PC, LCs, SCs). In the Guides meeting (GM), every two weeks (during project phase), SCs coordinate and exchange information and discuss problems with PM and PC. The International Offices meetings (IOM) are held by arrangement, to coordinate local marketing, application procedure and intercultural activities. Weekly stream-specific meetings/workshops ensure project progress and alignment among students and clients. All Students meetings (ASM) are used to answer students' questions, synchronize streams and present results. Local Student's meetings (LSM) address administrative issues and examination matters at the respective partner university. Client meetings (CM) report on the progress of the project and open questions are clarified as needed.

In order to ensure effective and efficient communication, various tools are used. The main platform is Slite, where all important information is stored e.g. minutes of meetings, presentations (maintained by PC). All project members (except for students) have read/write privileges on everything. In the individual streams, information and deliverables are managed via Moodle with general and stream-specific courses. Zoom is the main video conferencing tool with additional rooms provided for 24/7 use. A project calendar is set up on Google accessible for all project members (read-only for students). The primary communication platform for asynchronous communication is Slack where pre-configured channels can be used - general (all-board-experts-guides) and stream specific (with/without students) - or direct messages as appropriate. Finally, Agantty is used for stream-specific project management. However, the two projects have revealed that some platforms are more usable such as WhatsApp. Thus, platforms that cater for different network bandwidths need to be discussed and selected by the participants of each project.

#### 4. THE 2020 STUDENT'S PROJECT

##### 4.1. Participants

A total of 20 scholars were selected locally (see Table 1) before the start of the project on the basis of criteria such as academic performance, English language skills, motivation, previous intercultural/social engagement, and local need-based criteria. 8 additional students joined the Namibian project team later.

*Table 1.*  
*2020 project scholars (+ additional students).*

Country	Female	Male	Field of study	Level
Germany	1	4	Int'l Management, Business Comp., Software Systems, Mech. Engineering	Bachelor (4) Master (1)
Indonesia	1	4	Electrical, Mechanical and Industrial Engineering	Bachelor
Namibia	2	3+8	Software Development	Bachelor Honours (5+8)
Peru	1	4	Computer Science, Business Administration	Bachelor (4) Master (1)

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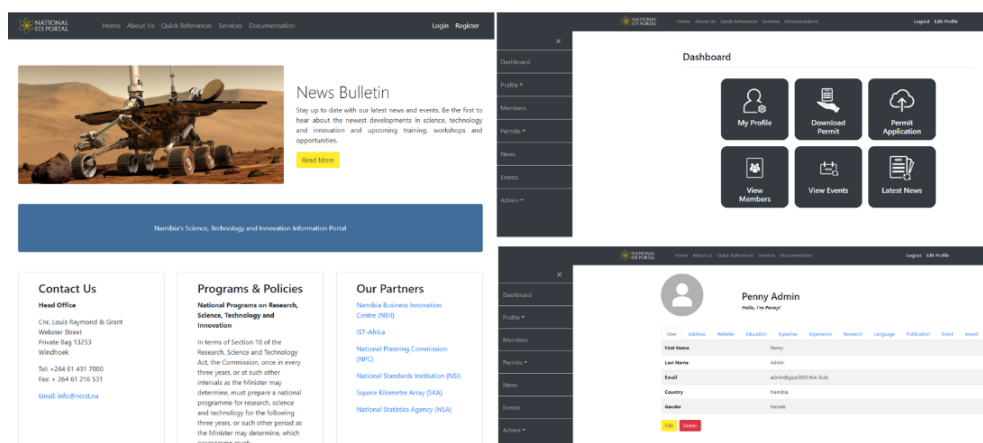
## 4.2. Tasks

The Namibian National Commission on Research, Science and Technology (NCRST) was identified as a suitable client, considering its (1) existing working relationship with the respective partner university, (2) strong commitment of its management for such a "learning project" carried out by students not professionals as well as (3) availability of English-speaking staff at the client-side. High-level requirements were agreed upon with NCRST prior to students joining the project. The task was to develop a national web portal to manage research projects, publications and researcher profiles referred to as the Science Technology and Innovation (STI) web portal. After signing off the requirement specification document and deciding on the most appropriate state-of-the-art technologies to be used, the project was internally divided into five sub-projects, each assigned to one team of students: (1) Object Model, (2) Documentation, (3) Quality Control and Assurance, (4) Frontend, and (5) Business Logic.

## 4.3. Process

The Object Model team duties were adjusted towards the end of the project to prepare deployment (handing over the application to the client) since their main task was a prerequisite for most of the other teams and already completed. The developed application (see the interface in Figure 3), including its documentation, was handed over to the client with minimal delay. As the client requested assistance with deployment as well as an extension of some functionalities, two Namibian students continued working on the project on the client-side, on a part-time basis.

Figure 3.  
The new STI web portal developed for NCRST.



## 4.4. Student feedback

As pointed out by (Jara & Mellar, 2010), student feedback is essential for quality enhancement especially in online courses. (Williams, Parkes, & Davies, 2013) present word clouds as an innovative qualitative tool to provide fast and attractive feedback enabling educators to adjust their programmes to positive and negative areas of student experiences. Figure 4 shows a word frequency cloud, based on the GIPE students' video transcripts and

Global Intercultural Project Experience (Gipe):  
A distributed interdisciplinary project-based learning framework

written text feedback, illustrating the most prominent topics such as project, experience, time, team, work, and challenge. We further provide supporting statements.

Related to the **project work** itself, the students recognized the professional support provided by the PC and the SC. An Indonesian student commented: "I appreciate this project, and when I go through the trouble, all the guides will help me through many problems." A Namibian student added that "there was always support. It was as much social as it was technical." A German student testified that "Due to the expertise of professionals, a great project manager who kept us on track every week, and the dedication of each team, we were able to do the final product that I am personally proud of".

Regarding their overall **experiences**, students expressed strong emotions. An Indonesian student stated that "this is truly a life-changing experience, although it wasn't smooth sailing all the way." while a German student exclaimed that "that's something you would normally never think of." Students fully acknowledged the learning opportunity the project provided, be it communication, technical or intercultural. For most of them, it was a chance to improve their English professional skills, as mentioned by a German student: "Within the project, I could improve my English skills and learnt how to work with an international team through different time zones."

Figure 4.  
Student reflections Word Cloud 2020.



The students appreciated working in a multicultural team and expanding their personal relations over continents. As expressed by an Indonesian student: "We were getting to know each other and even talking about our countries, such as our culture, food and daily life." A Peruvian student said, "I think the most amazing thing about it is the fact that I've worked with a lot of people from all over the world and we have achieved a very wonderful product for our client."

Besides the disruptions caused by the pandemic, the students mentioned a number of challenges with working across **time** zones as the most prevalent. A Peruvian student stated that: "One of the major challenges of the project was coordinating the team because of time zones. For some of us, that day was just beginning, others were about to have lunch and some

others were finishing their day". While another Peruvian student said that "From the beginning, we knew that it would be difficult to reconcile the schedules, since there is a difference of 12 hours with Indonesia, so our weekly coordination meetings and meetings with the students were adapted to that time." This sentiment was further confirmed by one of the German students "I think the most required ability, though, was being agile, adjusting to different time zones, participating sometimes late in the evening, all the morning during the weekends with different time zones and different means of communication." Yet another Peruvian student expressed the challenge of having to deal with multiple issues "I have to manage to overcome the difficulties associated with the pandemic, schedules, language, and, perhaps, specific knowledge of tools, to be able to develop together with students from Germany, Namibia, and Indonesia". One student was concerned with having been the only female in a team and her challenges of being heard and respected.

#### 4.5. Client engagement

The NCRST required a fully functioning platform to support the development of national STI policy and policy instruments effectively. They attended a number of meetings and training yet had insufficient internal capacity. The basic functionalities were implemented, and two students were assigned for deployment at the client-side. The Portal is loaded on the NCRST server yet not accessible for end-users.

### 5. THE 2021 STUDENT'S PROJECT

#### 5.1. Participants

A total of 32 scholars were selected locally (see Table 2) using the same selection criteria s in the 2020 project. 12 additional students joined later.

*Table 2.*  
*2021 project scholars (+ additional students).*

Country	Female	Male	Field of study	Level
Germany	5+5	3+1	Mechanical Engineering, Computer Science, Software Development, Business, Molecular Biology, Environmental studies	Bachelor (7+6) Master (1)
Indonesia	3	5	Engineering, Business Administration	Bachelor (7) Master (1)
Namibia	3+1	5+5	Computer Science, Tourism	Bachelor (3) Honours (5+6)
Peru	4	4	Business Administration, Computer Science, Electronics and Telecommunications Engineering	Bachelor

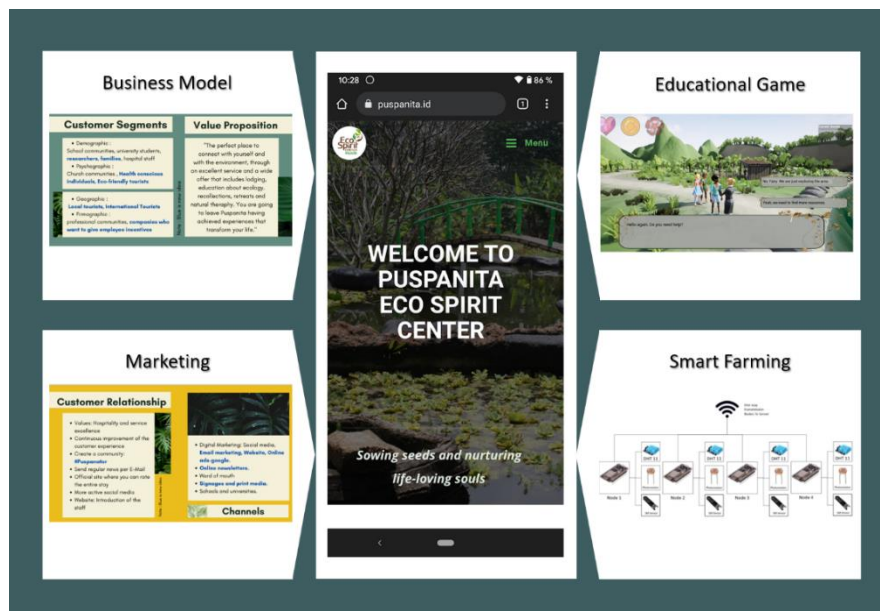


## 5.2. Tasks

The selected client, Puspanita Eco-Spirit Center, located in Indonesia, is a private institution providing eco-education to learners, students, and the general community. It was agreed to develop three digital tourism platforms, dividing the students into five working groups: (1) Business Model and Strategy, (2) Digital Marketing, (3) Website with Booking System, (4) Educational Games and (5) Smart Farming. Special attention was given to ensure each group has a student from each partner university to maximize the intercultural competence achievement (Burdett, 2014). Additionally, in each group a staff member from the client organization actively participated throughout the project.

The task of the Business model and Strategy stream was to create a new business model using BMC (Business Model Canvas) concept and propose alternative strategies for Puspanita to ensure the client keeps up with the current developments in digital technologies and make optimal use of their resources, as well expanding their market. The Digital Marketing stream was formulating marketing strategies utilizing digital technology and social media. Meanwhile, the Website stream created a website equipped with a booking system. Considering that the client was an educational institution promoting ecological concerns to children, the Educational Game stream implemented an online ecology education game. The responsibility of the Smart Farming stream was to develop innovative farming applications using IoT installations as a medium for learning and study media for visitors and students. Stream outputs are shown in Figure 5.

Figure 5.  
Various stream results developed for Puspanita Eco-Spirit Center.



### 5.3. Process

Since the first week, the students have been working on each of the streams. Scholars and clients communicated intensively so that user requirements were considered. A virtual spring school was organized replicating activities from the planned yet cancelled physical contact phase. All project streams completed their tasks on time. Each Stream reported its work to the GIPE project plenary and was launched in the Official GIPE 2021 Virtual Launch Event, which internal and external stakeholders attended. This activity was covered and disseminated by local Indonesian media and media in each member country. At the end of the project, each stream team was measured on intercultural competence, project management skills, and three stream-specific competence indicators. Additionally, the educational game stream co-opted six game-design students to improve the output of the apps.

### 5.4. Student feedback

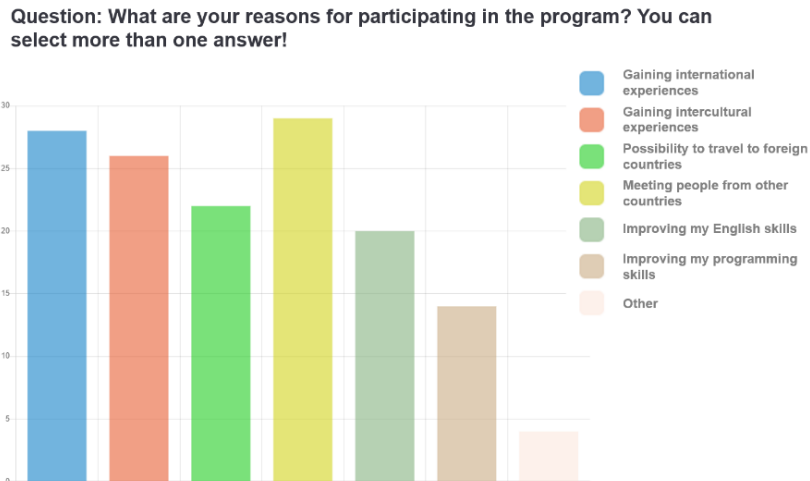
While some of the feedback is similar to the 2020 project, we observed new terms enlarged in the 2021-word cloud (Figure 6), such as business and model, which reflects the differences in project focus.

Figure 6.  
Student reflections Word Cloud 2021.



The high frequency of “**amazing**” relates to the enhanced experiences expressed by the students and confirmed by a separate survey conducted (see results in Figure 7), where it was revealed to be nearly as important as meeting people from other countries as a reason to participate in the project.

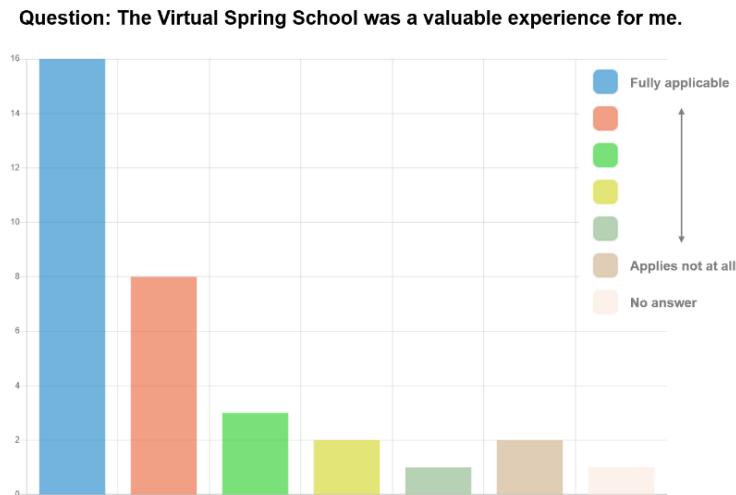
Figure 7.  
*Reasons for participating in the program.*



A Namibian student provided a comprehensive summary statement “My GIPE 2021 experience was unforgettable. Besides the fact that I had the chance to work and communicate with students from all over the world, we had a wonderful relationship with our client. It was **amazing** to have an intercultural exchange of ideas and perspectives, and it really allowed me to become more open-minded and learn about the world around me. I would highly suggest any student who has the chance to partake in this incredible project to do so!” An equally strong statement from a student in Indonesia confirms the sentiment “a memorable journey ... helped in building solid connections and sharing knowledge, which we shall continue beyond the project 2021... What an extraordinary journey and how I fell in love with the project.”

The importance of the Virtual Spring School through the lens of the students as shown in Figure 8 where such reasons as getting a better overview of the overall project e.g. what was happening in other streams, were among such aspects the students had to rate. The concern of not being able to physically participate at the Spring School was raised as confirmed by such feedback as, “It would have been great if we attend it physically” complemented by another sentiment expressed by a student: “I liked the intercultural experience in the Spring school and it was just then when I could meet other streams participants. I think it is good to have a social space for students to interact in the kick-off as well”.

Figure 8.  
Virtual Spring School ratings.



### 5.5. Client engagement

We captured the client feedback directly and indirectly from the responses during the stream meetings and at the virtual launch event at the end of the project. In general, the client was delighted with the students' work in all streams. The Business Model was a down-to-earth proposal easy to implement. In addition to creating digital content for marketing campaigns through social media, the digital marketing stream also created a new logo for a unique and modern eco-spirit center. The organization was especially grateful for the fully functional well-designed website with booking system. The installation of smart-farming equipment (IoT) to monitor soil conditions in organic crop plots, has convinced the client that it would be helpful for the people to learn how the ecological system works.

## 6. LESSONS LEARNT

We have identified five themes of interest that need special consideration in such projects.

### 6.1. Intercultural and interlingual competence development

As noted by (Cummings, 2021), students need cultural competence to make international collaboration work in online spaces. The intercultural nature of GIPE is one of the program's cornerstones, with partner universities located in Africa, Asia, Europe and South America, bringing the average distance between their campuses to more than 11,000 kilometers. The countries neither have a common language, nor much political or economic association, nor similarities in infrastructures or everyday life. Benefits of intercultural project experiences have been the development of transferable communication and management skills (Lycko & Galanakis, 2021), and enhanced multilingual communication competencies needed to navigate changing work contexts (Atabekova, Lutskovskaia,

& Gorbatenko, 2021). In GIPE, English was chosen as the official project language, not being the mother tongue of most students. Feedback from the scholars revealed that not only they needed to adapt to different accents but also to the peculiarities in communication codes of each country and culture. For example, subtle differences in communication forms meant that the Indonesian scholars asked their Western colleagues to turn on their cameras during meetings, as they expressed that face-to-face interaction, e.g. being able to see the other person, was essential for them. As team members grew to know each other, they also learnt to understand their partners. Nevertheless, the use of simpler language, with fewer figures of speech helped to keep a clearer communication channel between the project participants. Corner, Liu, and Bird (2021) postulated that in order to navigate complex interdisciplinary and intercultural projects recognizing perspectives, managing relationships, and navigating uncertainties are essential.

## **6.2. Team building**

Striving to enhance team cohesion, process and performance, Klein et al. (2009) suggest that team building should focus on (1) goal setting, (2) clarifying roles, (3) fostering problem solving and (4) facilitating interpersonal relations. In GIPE (1) and (2) were realized through the project organization and coordination, while (3) was given through the nature of the projects, (4) was fostered through additional activities. Team building and socializing activities are central elements in the GIPE framework, essential for the success of the project and the “fun part” of the experience. Team building was actively pursued at the Global Kick-Off and the Virtual Spring School, but played a recurring role throughout the GIPE projects 2021 and 2020. It was conceived and planned mainly by the IOs. It consisted of three elements: Low-threshold getting-to-know-you games, presentations about cultural & country differences (Country Facts Quiz, Educational System, Working Life, Stereotypes) and Socializing (Escape Game, World Café & socializing breakout-rooms). The games served as ice-breakers, the cross-cultural information was deepened especially during the Spring School to promote cultural understanding while the socializing events took place continuously to foster exchange between project teams. In addition, a friendship book (Fact sheet of all participants) with a playlist available online (favourite songs of each person) was distributed at the start of the project.

The measures were more comprehensive and successful in the second project. The friendship book and the socializing breakout rooms (“coffee kitchen”) were particularly successful. Overall feedback was “more activities should be planned, especially at the beginning”. Reduced to online only, the team-building was more challenging, in between other tasks and activities. The available time slots between the different time zones are limited and when project work is really needed, socializing activities are hard to be scheduled. In the future, team building activities could be planned in a more streamlined and stringent way and be more aligned with the individual project phases.

## **6.3. Knowledge and skills support**

As students from four different partner universities and from different programs take part in the projects, it’s inevitable that they join with different levels of prior knowledge and skills as regards the topics and technologies required in the project. (MacLeod & van der Veen, 2020) suggest a scaffolding approach to prepare students to work in an interdisciplinary team, by equipping students through carefully designed modules with the appropriate technical skills.

In the GIPE 2020 project, a Web Engineering project (with some business aspects for the few business students enrolled), almost all students needed to familiarize themselves with the state-of-the-art technologies and tools selected to be used. Therefore, in phase 1 tutorial material was compiled and provided to all students for some hands-on training finally also supported by two half-day workshops given by the Peruvian and Indonesian students for the students from Namibia and Germany who joined the project later due to different academic calendars. However, this familiarization phase reduced the time left for the development of the main application resulting in the hand-over of a core but functional web portal to the client.

As the scope of the 2021 project was much broader to attract students from various programs and strengthen the interdisciplinary character, familiarization with technologies, tools and methods did no longer take place separately. Faculty experts on each stream facilitated 'learning while doing'. Although this approach allowed for more time working on the deliverables for the client, students finally gained more project-specific knowledge and skills as needed to solve their particular tasks rather than general concepts.

In future projects, both aspects, (1) the alignment of prior knowledge and skills and introduction of general concepts and methods in phase 1 and (2) their application on the given project need to be carefully balanced to ensure that students are well prepared for the tasks within their sub-project but also leaving enough time to achieve valuable results for the client.

#### **6.4. Project organization**

Although a specific unique meeting time was selected considering all time zones, the participants expressed it to be a challenge. In further project implementations, a rotational time slot mechanism could be explored to distribute the burden of early or late meetings for one project partner. While the number of meetings seems excessive, they proved to be necessary to manage the project and ensure cohesion. However, the length of the meetings needs to be strictly controlled with measures such as voting instead of consensus-oriented discussions and use of a slack-channel for discussions could be adopted going forward. Regarding course and project organization, (Guth, 2013), reporting about 24 successful COIL courses, emphasizes that the use of asynchronous tools, real-time communication, course content, etc. is dependent on various factors. One important lesson learnt was the need to be flexible, and trial and error helped teams overcome difficulties of first-time courses. Considering the stream's handling of the projects and keeping the various teams into manageable sizes provides easy to monitor progress checks and identifying call for attention sections. Identifying Subject Matter Experts at the beginning of each project is a necessity to handle the multidisciplinary demands of the project. For this to be successful, however, it requires thorough requirements specification with the client at the onset. If new demands for the project surface, while the project has already kicked off and the required skills were not planned for, that is where complexity is birthed. Another challenge is the differing academic calendars, including student registration and availability.

#### **6.5. Impact of COVID-19**

Although GIPE was conceived as an online collaboration project since its inception, Covid-19 measures required a number of adaptations in the organization. Many team members reported a variety of challenges that arose throughout the pandemic that made effective teamwork challenging, as well as communication adjustments in terms of quantity and quality. Some students did not have adequate conditions for online participation at home and needed technical and financial support. Some participants were affected at a personal level either suffering of Covid-19 themselves or close relatives. Challenges are similar to the once reported by (Wildman, Nguyen, Duong, & Warren, 2021), who has analyzed 90

open-ended questionnaires of students who worked on group-projects during Covid-19 restrictions. Besides external factors, they also mentioned communication issues, student performance matters as well as logistics. In GIPE, organizing client meetings was a challenge in different phases of the lockdown in 2020, where the client was not reachable for weeks. Moreover, the postponement, and ultimately cancellation, of both spring schools was one of the most regrettable decisions that the program had to take. These kickoff meetings were intended for scholars, guides and staff to meet in person before starting to work together on each yearly project.

Having learnt from the first years' experience, the partners were able to plan in advance for a Covid-19 scenario. Subsequently, every interaction was scheduled to take place online, including client meetings. There were only a few impediments such as the inability to physically install the sensors for the Smart Farming stream and the impossibility to visit the client's facilities to develop the Mixed Reality platforms.

## 7. CONCLUSION

In conclusion, the GIPE project experience was enriching in many ways: culturally, academically, and professionally. Reviewing the sentiments expressed by the students confirms that though they experienced many new challenges they equally appreciated the learning and the multicultural context. Working in an interdisciplinary team on a software development project required a steep learning curve in a short time. The students received structured technical training and were exposed to new web programming frameworks, and learned good project management practices using professional tools. An invaluable reward was the creation of new personal and professional relations during a time of "social distancing". The Covid-19 pandemic drastically changed the implementation of the planned GIPE framework, depriving the students from travelling to Germany to experience a two-week team-building workshop, as well as depriving the German students from handing over the project to a client on another continent. Yet the distributed interdisciplinary projects were completed successfully with a multicultural team of students from four continents, serving as a proof of concept.

The encounter from the 2021 GIPE project of working hand-in-glove with the client as part of the project streams, brought alive the experience of participatory design methodology. There were best practices gained from facing head-on the challenges highlighted in this chapter. Being flexible to try new approaches and experiment with alternatives where need is called, will surely be part and parcel of steering the noble endeavour such as bringing the international, intercultural and interdisciplinary experiences to the participants of the GIPE project each successive year of its implementation. Each new project will present its own new challenges but learning from past failures and successes and being ready to adjust and customize accordingly helps in building the desired results without missing the main objective of the project which is to create a Global Intercultural Project Experience (GIPE).

We postulate that integrating such international projects in existing curricula across the globe promotes the acquisition of 21<sup>st</sup>-century skills for students from all disciplines. Although GIPE received funding for a period of four years only, it is intended to be continued and sustained once the processes have been established and the value for all participating institutions has been recognized. The coordination of such international educational collaborations, however, requires consideration of formal university structures, human resource-intensive project preparations, planning and management, communication dynamics and challenges, technical and methodological aspects. Based on our experiences, we conclude that a refined concept of this interdisciplinary, international project-based learning is a promising approach to support global educational development, even during pandemics.

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