

# Incorporating Global Learning Perspectives in a Freshman Computing Curriculum

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**Abstract**—This research-to-practice full paper describes our integration of global learning perspectives through a research-based group project in a First-Year Seminar course for new technology major students at our urban Midwestern university, IUPUI (Indiana University - Purdue University Indianapolis). Since 2003, the ACE (American Council on Education) has emphasized global competencies, which are defined as “the attitudes, skills, and knowledge to live and work in a multicultural and interconnected world”. Despite the increasing recognition of the importance of developing these global competencies, opportunities for young people to do so suffer from issues of accessibility. Educational institutions are challenged with providing opportunities to prepare students for global citizenship in the twenty-first century and are working to expand global competency education. Our undergraduate institution is no exception.

In accordance with this mission, we incorporated global learning perspectives through a group project in our First-Year-Seminar course to increase students’ interest in global learning experiences (such as studying abroad) and provide resources for students to develop global competencies. This is important both for personal development in the quest for a more equitable world and employability; employers repeatedly convey that awareness of global issues is a highly desirable characteristic in potential hires.

In our implementation, students selected a global issue, chosen from the United Nations Sustainable Development Goals database, which had unique significance to them and their communities. This approach allowed space for students to take ownership and agency over the content of their learning experiences while ensuring they engaged with the following learning objectives:

- 1) Team collaboration, communication, and cohesion
- 2) Conducting independent research on a global problem and its solutions
- 3) Synthesis of information from multiple sources and perspectives to develop an informed stance
- 4) Developing a stance regarding a global problem and justification of this stance using data
- 5) Creating a well-organized deliverable with consideration for the audience (i.e., their peers) and context

We point to course survey data and student reflections to evaluate our course. Students conveyed how the course structure enabled them to (a) consider global perspectives around issues that may or may not have been salient to them before the course, (b) experience empathy for people experiencing challenges related to the issues of interest and gratitude for their circumstances, and (c) consider their personal role in addressing global issues in their communities. Students also indicated an interest in further addressing such issues through self-education and advocacy on a community and political scale.

To further expand efforts to make global competency education accessible, our next implementation will utilize Collaborative Online International Learning experiences in which students virtually collaborate with students outside of the United States through our local Office of International Affairs. Through these collaborations, students will be challenged to consider how such global issues manifest in different communities, cultures, and geographic regions and the implications of these differences for solution design.

**Index Terms**—First-Year-Seminar, Global Learning, Sustainable Development Goals.

## I. INTRODUCTION

This study integrates global learning perspectives through a research-based group project in a First-Year-Seminar course offered for technology major students at IUPUI. Since 2003, ACE (American Council on Education) has been promoted to create opportunities for students to gain global competencies, defined as “the attitudes, skills, and knowledge to live and work in a multicultural and interconnected world” [1]. Educators, governments, and employers have also recently increasingly recognized the importance of global competencies [1]. Currently, among U.S. companies, 93% seek employees who are “able to work effectively with clients and customers from different countries and cultures”; 64% seek employees with multicultural experience; 49% seek employees with overseas experience; and 35% give preference to multilingual candidates [2]. Data shows that students who participated in the study abroad program have a greater probability of graduating within four years and 50% of the students who studied abroad reported that their program experience helped them to get their first job. Likewise, 65% of study abroad students mentioned that their international experience helped them to be successful in their first job and students who studied abroad have higher chances to get full-time jobs after graduation [3]. In order to promote students’ success in a globalized world, it has become increasingly imperative that institutions of higher education expand opportunities for global learning.

To respond to the above call, many colleges and universities included internationalization in their mission statements as their institutional priorities. Since 2011, 72% of higher educational institutions announced their advancement in interna-

tionalization and another 30% of the institutions reported that internationalization was included in their mission statements as a high or very high priority [4]. For developing global competency for students, study abroad programs have been seen as one of the main pathways for internationalization [5]. The experience of studying abroad is undoubtedly a valuable method for developing global competency. Nonetheless, less than 10 percent of four-year undergraduate students in the United States have an opportunity to participate in study abroad [6]. Therefore, American institutions of higher education need alternatives to studying abroad to deliver global learning to most students [1]. As part of its efforts at curriculum internationalization, our institution is also profoundly emphasizing global learning; the Dimensions of Global Learning were endorsed in 2020 to develop a global mindset for all of our students [7].

In response to our institutional goal of curriculum internationalization and to the global learning initiatives within higher education, we incorporated global learning perspectives through a group project in our First-Year-Seminar course; our intervention aimed to increase student's interest in global learning activities, such as study abroad and collaborative online international learning (COIL), and to provide students with the foundations of globally responsible citizenship. These goals are important both for personal development in the quest for a more equitable world and for employability, as it is becoming increasingly important to employers for employees to have global awareness at various levels [8]. The group project aimed to help students learn about a social issue in the U.S. within a global context. Students worked together to explore from multiple perspectives a global issue selected from the 17 United Nations Sustainable Development Goals (SDGs) [9]. Beginning at the World 101 website [10], students selected the SDG that most interested them, selecting from topics that included Life Below Water, Women's Equality, Peace Justice, Quality Education, Climate Change, and Health Wellness. The project, which had students work in small groups to research their topics, invited students to explore a local issue they care about and learn more about its global implications. Students were asked to describe the Sustainable Development goal they chose and explain why it is of concern both locally and globally, provide additional context and information about it, state what can be done both locally and globally to achieve the goal, and explain what they can do personally to help achieve the goal. The student learning objectives for the activity were:

- 1) Team collaboration, communication, and cohesion
- 2) Conducting independent research on a global problem and its solutions
- 3) Synthesis of information from multiple sources and perspectives to develop an informed stance
- 4) Developing a stance regarding a global problem and justification of this stance using data
- 5) Creating a well-organized deliverable with consideration for the audience (i.e., their peers) and context

When the project was completed, an anonymous survey was conducted to evaluate the impact of our project on increasing students' awareness of global learning. The survey results indicated that approximately 95% of students believed that the group project allowed them to consider issues from multiple perspectives. Students' written reflections also demonstrated the effectiveness of the project in making students more aware of various global issues and more conscious of the global impact of their actions and their roles in making a more equitable world.

## II. BACKGROUND & RATIONALE

### A. *Global Learning Movement in Higher Education*

Promoting world peace and global understanding has never been more urgent. Until recently, however, global learning has not received enough attention from researchers. For instance, in one of the first meta-analysis studies, Wiek and colleagues documented 43 educational competencies for sustainability and global learning [11]. Following that, Marco Rieckmann [12] [13] conducted an international Delphi study that supported the above findings. The outcomes of these research studies became the foundation for UNESCO's Framework on global citizenship education [14]. Later on, this framework shapes the curricula for global learning around the world [15].

As discussed, the primary pathway for internationalization - global learning is increasingly being included in the institutional priorities and mission statements of many colleges and universities. To develop their students as global citizens in this ever-changing, dynamic and volatile world, many higher education institutions recognize and highlight the critical role of global learning and its outcomes [4]. Currently, education in general and higher education, in particular, has undergone drastic changes under globalization. As a result, we see an increasing number of international students in U.S. colleges and universities and growth in the study abroad program participants. For example, in the academic year of 2017-2018, a total of 1,094,792 international students enrolled in the United States' higher education institutions, this number is 85 percent more than international students enrolled in the past ten years [16] [17]. Similarly, in the academic year of 2017-18, a total of 341,751 U.S. students participated in studying abroad. This number is a 46% increase over the previous ten years [17]. To maintain the international ranking and participate in the globalization movement, colleges and universities have established campuses overseas [4] [18]. These initiatives can be attributed to higher education institutions' response to globalization and comprehensive internationalization. Therefore, many colleges and universities indicated their strong interest and emphasis on internationalization. Zhou [4] notes that since 2011, 72% of higher educational institutions communicated their advancement in internationalization, and another 30% stated that their inclusion of internationalization in their mission statements as a high or very high priority. Some of the current practices associated with internationalization within U.S. institutions include (1) Branch/Satellite campuses in other countries; (2) Offering joint degree programs with institutions

abroad; (3) Study abroad and exchange-student programs; (4) Promoting foreign language and cultures; (5) Globalized curricular content; and (6) Enrollment of international students on U.S. [19].

Even though global learning is getting more attention in higher education, first-year students and computer science majors appear to have less involvement and access to it. In Jiangyuan Zhou's study of students who were involved in global-focused co-curricular activities on campus, such as international student organizations, foreign language tables and a globalization lecture series, only about 3% of the students were freshmen. The study also revealed that technology major and computer science students are least engaged in global competencies compared to other disciplines, with only about 9% of students being computer science majors [4]. Likewise, Chrissie Faupel's study [5] showed that first-year students have constantly low enrollment among study abroad students; in the academic year 2012-2013, 3.8% of students studying abroad were first-year students, whereas juniors constituted 37.4% of the study abroad population.

Higher education leaders around the world are increasingly recognizing the need for change in our approach to educating students in the twenty-first century, where globalization has impacted every facet of society. Being increasingly interconnected on a global scale makes it more imperative than ever that institutions of higher education set students on a sequential pathway toward becoming globally prepared graduates, beginning with a foundational experience in the first year and building up to graduation [20]. According to Nels Granholm [21], solving global problems necessitate global citizens with skills in communicating, problem-solving, and working in teams. Granholm notes the paucity of college-level courses that allow students to "connect the dots" by focusing on "interdisciplinary global interrelationships and global interdependence" and calls on universities to "train students in all disciplines to become authentic global citizens" [21]. First-year seminars thus provide an important opportunity to introduce students to global learning so that their subsequent coursework can further develop their intercultural competence skills and thereby prepare them for global citizenship.

To improve the global learning experiences among first-year students, many colleges started to offer global learning programs [5]. While the structure of these programs may vary, the similarity across these programs is that they target first-year students, mainly in the form of study abroad programs. For example, Rollins College in Florida offers a First-year field study program for incoming freshman students and Syracuse University in New York offers a Discovery study abroad program for their students [5]. At Elon University, over 70 percent of the undergraduate students enrolled in their programs study abroad after completing an interdisciplinary first-year seminar course that emphasizes global studies as a foundation for the college experience [22].

A recent study reported that U.S. domestic college students are graduating with low levels of global and intercultural competency [19]. One of the reasons for this can be attributed

to the lack of pedagogical knowledge or skills. Thus, to improve the effort, (1) educators need professional development training to internationalize their curriculum, and (2) the higher education institutions need to find pathways for improving global competency besides study abroad programs. As discussed earlier, less than ten percent of total undergraduate students enrolled in four-year undergraduate degree programs in the United States participate in study abroad programs [1] [6]. A few researchers have suggested that international students could be critical sources for global learning because of their cultural and linguistic differences and encouraging co-curricular activities to interact on the issues of global significance could promote opportunities for global engagement (e.g., [19]). Further, through these activities, both international and domestic students will have opportunities to question their assumptions, beliefs, and knowledge, which could instigate a change in perspective. As another approach proposed by Ward [1], higher education institutions could promote online communications to connect with faculty and students across borders. These virtual exchanges can provide significant global learning and cross-cultural experiences and they are gaining popularity at higher educational institutions within the United States and around the globe because they are accessible, affordable, and flexible at the same time. Many American and international institutions have adopted one such virtual exchange program called the Collaborative Online International Learning (COIL) to advance the internationalization of the curriculum.

Recognizing the importance of global knowledge and experiences in today's globalized workplace, universities are increasingly looking for ways beyond student exchange programs to develop students' intercultural competence. Some practitioners are using group-based projects that point to the diverse world beyond the classroom in order to enhance intercultural communication among students. Liu and Dall'Alba (2012) [23], for example, changed an individual-based assignment to a group-based project based on prior research demonstrating that collaborating with culturally different peers results in enhanced cultural awareness and greater appreciation for different viewpoints. With the proliferation of distance learning on account of the COVID-19 pandemic, teachers have been innovating with virtual collaborative projects, which allow students at separate universities in different geographical locations to collaborate through technology to achieve common goals and to fulfill various learning outcomes, including intercultural competence. When undergraduate Business students in Spain collaborated with Business students in the Netherlands, their project was structured around a series of tasks, including information exchange tasks, tasks that involve the comparison and analysis of cultural products, and collaborative tasks [24]. Designing suitable tasks for telecollaborative projects requires teachers to tend to "an intricate interplay of pedagogical, technical, linguistic, and intercultural factors" [25].

### *B. Our Institutional Priority in Global Learning*

Our institute is committed to preparing all students to be citizens of the world through global learning. “The IUPUI Dimensions of Global Learning are designed as a tool for faculty, staff, and administrators to help them develop more intentionally global and intercultural learning experiences across the curriculum and co-curriculum.” [7].

The IUPUI Dimensions of Global Learning represent a vital step in achieving IUPUI’s goal to: “Develop curricular and co-curricular activities that enable all IUPUI students to have at least one substantial global learning experience during their IUPUI career, either internationally or locally.” [7]. With a global mindset, our students will be able to: “1) Analyze their own beliefs, values, assumptions, experiences, and communication styles concerning at least one other culture. 2) Practice intercultural communication with the intent of cultivating respectful and productive collaboration, dialogue, and engagement with others. 3) Demonstrate understanding of the workings of other nations, cultures, and the geopolitical processes and systems that connect the world. 4) Explain the global, international, and cultural dimensions of their disciplines, professions, and educational interests. 5) Summarize the consequences of policies, global systems, and historical trends for people, as well as people the world over the impact of these processes. 6) Incorporate diverse perspectives and sources of knowledge to analyze, evaluate, and address contemporary and historical global problems. 7) Apply learning from internationalized experiences in the communities and contexts they live, work, learn, and serve. 8) Use ethical and inclusive frameworks to inform decision-making, cross-cultural teamwork, and solutions to global and local problems and inequities.” [7].

To provide students with a global learning experience, our institute is emphasizing curriculum internationalization, which is defined as “the incorporation of an international, intercultural, and global dimension into the content of the curriculum as well as the learning outcomes, assessment tasks, teaching methods, and support services of a program of study” [26].

Under a federal grant, our institute is currently expanding global education to offer international learning skills and competencies to first-year students and transfer students by building Global Learning Foundations. These global learning curricular foundations will support students to explore and successfully navigate four different global engagement pathways namely, international study, study abroad, world language, and global career. This effort will create opportunities for students to achieve the necessary global, intercultural, and multilingual skills for academic and career success. These foundations will integrate high-impact global practices into the first-year seminar and world-language courses. They will provide equitable access to global learning for transfer students and underrepresented minority students who often do not have access to international education.

### *C. Departmental Initiations in Global Learning*

Currently, our Computer and Information Technology (CIT) department has only one course (Global IT, CIT 41600) that has a global learning component. The objective of this course is to increase students’ understanding of the challenges encountered by information technology (IT) professionals while they work in a global setting. In this course, students meet and work with industry professionals whose careers are shaped by their personal experiences in the IT industry, education, and international culture. In this course, students collaborate with students either from China or India to work on a collaborative project to analyze the similarity and differences in their IT fields and Software development process. The course requires students to collaborate within and outside the classroom. The course has an embedded study abroad program to visit China/India during the spring break. However, only a limited number of students (maximum capacity of 20 students) can enroll in this course. In response to the higher education and our institutional global learning movement, we incorporated a global learning perspective in a first-year seminar course (TECH 10200) for technology major students in our department. We targeted this population because data shows that this group of students currently has the least involvement and access to global competency. Also, we believe that interesting our students in global learning at a very early stage will predispose them toward participating in global learning experiences later, thereby laying a foundation for their quest for a more equitable world.

### III. RELATED WORK

Even though freshman courses got the least attention for the global learning initiatives compared to the higher-level courses; various U.S. Universities and colleges have begun offering study abroad and other pathways for global learning to freshman students. For example, Rollins College in Florida offers a first-year field study for incoming first-year students. Likewise, Syracuse University in New York, American University in D.C., and Northeastern University in Boston provide a study abroad opportunity for freshmen students [5]. Similarly, other universities have begun globalizing their first-year seminar. For instance, the University of California Davis [27] offers an FYS global learning seminar for first-year students to explore cultural diversity and global challenges. This seminar targets to develop students’ awareness and critical thinking skills. This seminar is seen as a crucial way UC Davis pursues Global Education for All—their mission is to provide UC Davis students 100% global learning experiences. In addition to building global awareness and embracing diversity, this global learning seminar aims to improve students’ sense of identity, community, and ethics and their ability for problem-solving and perspective-taking.

Through its Global Carolina initiative, the University of South Carolina (USC) provides students global knowledge and cultural awareness to make their students globally responsible citizens [5]. Their study abroad office created a new program, U101: Global Perspectives launched in the Fall of 2017 to

create global learning competency opportunities for their freshmen students and to encourage more students to participate in study abroad. This course focused on cross-cultural learning through an embedded study abroad program. Course activities guided students to think deeply about their own identity in relation to local and global contexts using various cultural theories. During the fall break, the students traveled to Quebec City, Canada to explore the Canadian culture. Upon returning to USC, the students articulated their experience abroad in a meaningful way and formulated future professional and academic goals accordingly.

Similarly, the German students enrolled at Marion University, Indiana, along with their freshmen students, engage with different local community members to enhance their learning about the German culture, to create professional connections, and to build community [28]. Furthermore, they invited guest lecturers from Germany; arranged guided tours to German American architecture in Indianapolis and Carmel Christkindlmarkt, Indiana; participated in a study trip to the German American Chamber of Commerce in Chicago; attended Indiana-Germany Business Conference and participated in the German Undergraduate Research Conference (GURC) at Illinois Wesleyan University in Bloomington, IL.

At Elon University, North Carolina, a first-year seminar called “The Global Experience” invites students to examine personal and social responsibility in both domestic and global contexts. Carefully integrated with the university’s liberal arts mission, the course is conceptualized as the “beginning of a four-year (and hopefully life-long) exploration of global learning” [22]. Over 70 percent of Elon students study abroad, and many of them participate in globally oriented internships, service-learning, leadership, and/or research experiences. A foreign language requirement encourages the students to engage with other cultures and many of the other courses from which the students select contain a disciplinary approach to global studies. Finally, an interdisciplinary capstone requirement invites Elon students to integrate their global learning college experiences into a final project.

#### IV. OUR APPROACH: GLOBAL LEARNING PROJECT FOR FIRST-YEAR-SEMINAR COURSE

##### A. Purpose

In Fall 2021, this project was designed for a First-Year-Seminar course for the technology major students (TECH 10200) at IUPUI. This assignment introduced students to the United Nations Sustainable Development Goals (SDGs) through the World 101 website [10] and United Nations Sustainable Development Goals (SDGs) website [9] [14]. By working in small groups to research the topic and develop a presentation together, students learned about their selected SDG. They also aimed to develop leadership and team-building skills, which will be helpful in most college classes and their career.

This project involved: (1) Collaborating with a team to accomplish a goal; (2) Identifying and conducting independent research on a global problem and solutions; (3) Analyzing a

problem systematically and identifying solutions supported by data that align with the problems; (4) Synthesizing information to develop an informed view; (5) Composing a well-organized, clear, and concise report to expand their classmates’ awareness of a global issue; (6) Properly citing the sources; and (7) Learning about two additional SDGs.

The project aimed to encourage students to take into account multiple perspectives on global issues, develop collaboration skills, conduct research independently, and cultivate data literacy. For technology majors, leadership and team-building skills are very important. Engineering and Technology employers often express dissatisfaction with the individualistic work ethic of new graduates relative to more team-oriented perspectives and practices [29]. Thus, researchers recommend that engineering and technology educators integrate team-building skills into their classrooms which help to develop critical thinking, communications, and leadership skills [29] [30]. Working effectively in a collaborative team is also an outcome required by the Accreditation Board for Engineering and Technology (ABET) [31]. These authentic-to-industry interpersonal skill sets in engineering and technology education, such as offering and receiving constructive feedback, delegating tasks, team management and planning, conflict resolution, and collaborative design, are essential [32]. As a result, in this project we heavily emphasized on teamwork skill/ competency development. For technology majors, learning how to conduct research independently is also essential because, with the frequent and continuous technological advancements in the technology field, industry recruiters are heavily prioritizing candidates’ abilities to learn and adapt to new technologies independently. To consider industry trends, students need to be independent learners, and they do so by conducting independent research. Our project also required the students to learn data literacy since supporting claims based on data is commonly required by technology major students.

##### B. Tasks

- 1) **SELECT A TOPIC** by the due date. [Students were required to select a topic of their interests from the World101 Website [10] or United Nations Sustainable Development Goals website [9] [14].
- 2) **SET A MEETING TIME**. By the due date, communicate with your team members to set a mutually agreeable date and time for a meeting. You can meet in person, by phone, via Zoom, or in our Chat Room.
- 3) **MEET AS A TEAM**. Complete your first meeting by the due date. Meet together with your team, whether in person, by phone, via Zoom, or in our Chat Room to discuss team agreements, including appointing a team leader, preferred method of communication, delegating tasks, setting deadlines for tasks, and providing positive feedback.
- 4) **TEAM AGREEMENTS** (Appendix A). Complete, together with your team, the Team Planning Sheet Contract. Submit your completed Planning Sheet Contract and upload it to Canvas by the due date.

TABLE I  
LEARNING OUTCOMES AND ASSESSMENT INSTRUMENTS

Learning Outcomes	Assessment Instruments
LO1: Team collaboration, communication, and cohesion	Task 11: EVALUATE YOUR TEAM MEMBERS Students emails and verbal/written concerns related to team members. Quote from survey: “How to work in a group setting with people you barely know and end up with a great finished project” “Group work doesn’t always work out. This will impact my future decisions because now I know not to pick people for my group whose work ethic I am not familiar with”
LO2: Conducting independent research on a global problem and its solutions	Task 5: CONDUCT INDEPENDENT RESEARCH
LO3: Synthesis of information from multiple sources and perspectives to develop an informed stance	Task 8: DESIGN A PRESENTATION Task 10: NARRATE AND POST THE PRESENTATION Task 12: POST RESPONSE REFLECTIONS TO TWO OTHER TEAMS
LO4: Developing a stance regarding a global problem and justification of this stance using data	Task 7: JUSTIFY THE SOLUTION
LO5: Creating a well-organized deliverable with consideration for audience (i.e. their peers) and context	Task 8: DESIGN A PRESENTATION Task 10: NARRATE AND POST THE PRESENTATION

- 5) CONDUCT INDEPENDENT RESEARCH on your topic, beginning with the World 101 website and the United Nations Sustainable Development Goals website and then building out from there. In addition to the World 101 website, your presentation requires three additional credible sources that include authors whose backgrounds you can research to assure that they are credible; two of your sources need to be peer-reviewed (“refereed”). Sources need to be cited in APA format. Your group’s compiled reading notes, which include proper in-text citations and a bibliography in APA format, are due on date.
- 6) MEET ONCE AGAIN AS A TEAM. At least once more after you’ve read the work and conducted your own research to exchange ideas with your fellow team members and to come to agreement about what is important to communicate in your presentation.
- 7) JUSTIFY THE SOLUTION. Based on data show that the solutions you identified address the global issues.
- 8) DESIGN A PRESENTATION. Put the information you find into a clear, logical, and interesting PowerPoint presentation that contains the main points you wish to make the topic. Be sure to cite your sources properly according to APA format. You may wish to include social justice considerations, such as how the issue affects people based on race, culture, gender, and/or class. Submit your slideshow by due date.
- 9) WRITE THE NARRATION NOTES. Compile your notes for the narration of your PowerPoint. Narration notes are due on date.
- 10) NARRATE AND POST THE PRESENTATION. You can choose how you wish to do this. You can have one or two team members narrate the slideshow, or you can all share the narration, as you like. Post your narrated slide show to this Assignment tab AND to Canvas Discussion

- 11) EVALUATE YOUR TEAM MEMBERS. Half of the points for this assignment are determined based on your evaluations of the cooperation you experienced from your team members. Please assess your team members by completing and submitting the Team Member Evaluation Sheet (Appendix B) by due date.

- 12) POST RESPONSE REFLECTIONS TO TWO OTHER TEAMS. In two Discussion Posts of at least 180 words, reply individually to the videos of TWO other teams by the due date. In both of your response posts, discuss (1) one thing you learned from the presentation that you found particularly interesting; and (2) something you learned from the presentation that is relevant to yourself or your world.

Table 1 shows our five learning outcomes and associated tasks to measure students’ success.

### C. Project Evaluation Criteria

- 50 points assigned by instructor based on team members evaluation (Appendix B) about contributions to the team project.
- 50 points assigned by instructor on the basis of:
  - 10 points – General discussion of the issue and the causes of the problem, how it relates to us, and its global implications (min. 3 slides)
  - 10 points – Additional research or learning activity by the group gave more perspective on the issue and/or solutions to it (min. 2 slides)
  - 10 points – Data literacy. The problem and potential solutions were derived from reliable and relevant data on the issue.
  - 5 points – Presentation included some reflection about what was learned from the research and/or collaboration (min. 1 slide)

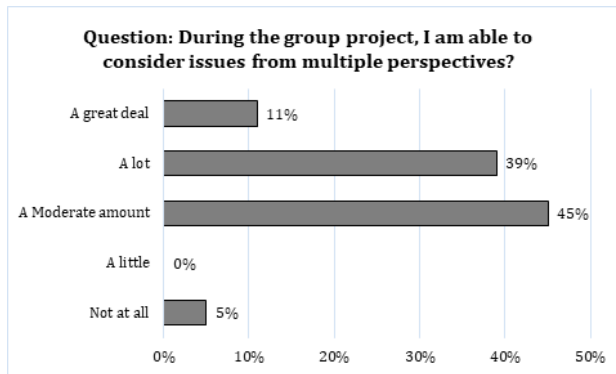


Fig. 1. Survey results for the Question “During the group project, I am able to consider issues from multiple perspectives?”.

- 10 points – Well-designed visuals that minimize text and use bullet points to convey main points.
- 5 points – Engaging and informative narration

## V. RESULTS & DISCUSSION

Each task score and overall project scores (project class average scores were 87%) show that each project group achieved our targeted five learning outcomes, including analyzing information or issues from multiple perspectives. As collaboration was one of the key learning outcomes of our project, we analysed 1) students peer evaluation forms (Appendix B) in term of their self and peer assessment scores and rationales (which is a commonly used instrument to evaluate teamwork [33]) 2) instructor observation data 3) project performance data to evaluate students’ development in teamwork. Overall, the groupwork was a success with few minor issues.

To evaluate the impact of our project on increasing students’ awareness of global learning, we conducted an anonymous survey (Appendix C) at the end of the Fall 2021 semester. In total, 23 students participated in the survey. The survey results show that approximately 95% of students think that during the group project, they were able to consider issues from multiple perspectives (shown in Figure 1).

Through course survey, student project reflections, and course evaluation, students conveyed how the project structure enabled them to (a) consider multinational perspectives around issues that may or may not have been salient to them before the course as shown in figure-1, (b) experience empathy for people experiencing challenges related to the issues of interest and gratitude for their circumstances, (c) recognize their personal responsibility for addressing global issues in their own communities, (d) develop interests in further addressing such issues through self-education and advocacy at a community and political scale. Table 2 shows students’ direct quotes from the anonymous survey, project reflection, and course evaluation on various reflection areas.

Students’ reflections revealed the extent to which the collaborative assignment fulfilled its objectives. Students defined “globally responsible citizenship” with greater precision and applied their definitions both to themselves and to their re-

search topics. One student reflected that “A globally responsible citizen should know what is going on in the world and should be thinking of ways to help solve issues. This project helped me learn of some of those issues.” Another student offered that the most impactful thing they had learned from the class was, “Learning about the coronavirus has helped me greatly in becoming more aware of what’s happening in the world and how much this disease really impacted the world. This gave me a better perspective on the world and how they get affected by issue that happen. I hope this makes it so in the future I will understand where people are coming from when they have issues and be more sympathetic.” Another respondent wrote, “The first step to being globally responsible is being aware of the issues, and this project helps us do the research necessary to stay informed.” Yet another student reflected, “A globally responsible citizen is someone who keeps up to date with events happening all around the world. This project helped me as I got to not only research my own topic but learn about others.” The impact of the project on some of the students was particularly profound. On the end-of-semester course evaluation, one student recalled that they particularly enjoyed working on the collaborative project, explaining that “Learning about global issues is the best way to get involved.” In addition to learning about the topics they researched, the group project refined students’ intercultural collaboration skills. One student reported having learned from the course “how to work in a group setting with people you barely know and end up with a great finished project.”

## VI. CONCLUSION

In this research, we integrated global learning perspectives through a research-based group project in a First-Year Seminar course for technology major students, as this population has the least access and involvement in global learning competencies throughout the United States. Also, involving students in global competency early in their program should increase their interest in getting involved in global learning experiences later in their programs and develop foundations for their personal development in the quest for a more equitable world. Our evaluation data shows that the group projects fostered the students’ ability to analyze global issues such as COVID-19, cyberspace & cybersecurity, global health, terrorism, and development from multiple perspectives. In the future, to evaluate the effectiveness of our project, we will also keep track of how many of our First-Year-Seminar students end up enrolling in our department’s Global IT course, other Study abroad programs, and other global learning competencies offers by our university.

Our next step in engaging students in global learning and preparing them for global citizenship will involve a virtual exchange. We plan to collaborate with an international higher education partner to pilot a virtual global exchange project relating to the students’ selected SDG. Over the course of several weeks, domestic and international students will communicate synchronously and asynchronously to get acquainted and learn more about each other and their personal and cultural back-

TABLE II  
STUDENTS' REFLECTIONS

Intercultural Competence Indicator	Excerpts from Students
Broadened awareness of issues and their global implication	"Learning about the corona virus has helped me greatly in becoming more aware of what's happening in the world and how much this disease really impacted the world. This gave me a better perspective on the world and how they get affected by issue that happen."
Increased empathy	"I hope this makes it so in the future I will understand where people are coming from when they have issues and be more sympathetic."
Cultivated a sense of personal responsibility	"To work towards a more equitable world I hope to obtain the resources to help out anyone I can, further my awareness in problems outside of my community, and advocate for policies with more fair implications." "Give back. Volunteer. Help others." "Educate myself, Try to make a difference, Speak up about issues."
Fostered interest in further action	"The three things I hope to do in my own life to work toward a more equitable world are: hear from other perspectives, learn how to involve everyone, make my own thoughts heard as well." "I would like to help poor families in Iran, adopt from children and try to live an eco-friendly lifestyle." "Improve global cyber security, bring connection to those who don't have it, and help teach the world about information security."

grounds. They will then begin working in teams that include both international and domestic students to learn more about how their particular sustainable development goal relates to the team members in both cultural contexts. Their final projects will include this information, along with reflections on their learning throughout the process. These initiatives are more important than ever with current study abroad opportunities being so limited.

#### APPENDIX

##### A. Team Work Planning Sheet & Contract

- 1) Team members:
- 2) How does the team envision working together?
  - a) Communicating ideas, sharing information (introverts extroverts, varying levels of assertiveness)
  - b) Decision making (is it ok to disagree? If so, how will a team decision be arrived at where individual input is considered?)
  - c) Managing conflicts – who and how?
  - d) Delegating tasks – who and how?
- 3) What role(s) will each member of the team assume? What assignment does each person have, and what is the due date?
- 4) How will the group handle a situation in which tasks do not seem evenly distributed?
- 5) How will we give feedback to each other in positive, helpful ways?

Team members signature

##### B. Team Member Evaluation Form

Your name Please honestly evaluate your team members' contributions to the success of your group project. Try to be completely objective, grading on the effort you saw, ignoring any personality conflicts you may have felt. This evaluation is worth 50% of each individual's grade. The other 50% the

grade will be assigned to the entire team by your instructor based on the presentation grading rubric.

Write the names of your team members, including yourself, in the left column. In the next column itemize the contributions that team member made to the group project. In the next column, you have \$100 to divide among your team members according to the value of the work they contributed toward the final project. In the final column, offer explanation and specifics if the money isn't being divided evenly. Submit your completed form to the Peer Evaluation assignment in Canvas by the due date.

TABLE III  
STUDENTS' PEER EVALUATION RESULTS

Team Member (Include Yourself)	Contributions Toward Project	How much of the \$100 this team member deserves	Rationale

##### C. End of the Semester Survey Questionnaire

Q1. During the group project, I am able to consider issues from multiple perspectives?

- Not at all
- A little
- A moderate amount
- A lot
- A great deal

Q2. In your own words, please define "globally responsible citizen." How has the project helped you to become a globally responsible citizen?

Q3. What is the most impactful thing you have learned so far in this class? How has/will this impact your future actions?



Q4. Please list 3 things that you hope to do in your own life to work towards a more equitable world.

Q5. What suggestions do you have for changes regarding how the group project is structured? What can I/we do to help you engage better with global issues and solutions?

## REFERENCES

- [1] H. Ward, "Connecting classrooms: Using online technology to deliver global learning," *ACE [American Council on Education]*. Retrieved from <http://www.acenet.edu/news-room/Pages/Internationalization-in-Action-Special-Edition-Connecting-Classrooms-Using-Online-Technology-to-Deliver-Global-Learning.aspx>, 2016.
- [2] "Infographic," <https://cultr.gsu.edu/infographics/>, accessed March 24, 2022.
- [3] "Institute for the international education of students. Career outcomes of study abroad students." <http://www.iesabroad.org/system/files/resources/>, accessed March 24, 2022.
- [4] J. Zhou, "Global learning: Definition, assessment, and approaches," *Journal of Global Education and Research*, vol. 6, no. 2, pp. 115–132, 2022.
- [5] C. Faupel, "U101: Global perspectives a semester course for first-year students," 2016.
- [6] "Institute of international education. 2015. 2015 Open doors report on international educational exchange." accessed March 24, 2022.
- [7] "Iupui dimensions of global learning," <https://international.iupui.edu/global-learning/curriculum-internationalization/global-dimensions.html>, accessed June 24, 2022.
- [8] A. Denney and K. Fryling, "Iupui, ivy tech to expand global education in indiana. news at iu." <https://news.iu.edu/stories/2021/02/iupui/releases/24-global-learning-first-year-experience-international-education-grant-ivy-tech.html>, accessed March 25, 2022.
- [9] "United nations department of economic and social affairs. (2015). The 17 goals — sustainable development. un.org." <https://sdgs.un.org/goals>, accessed March 24, 2022.
- [10] "World101 Website," <https://world101.cfr.org/>, accessed March 24, 2022.
- [11] A. Wiek, L. Withycombe, and C. L. Redman, "Key competencies in sustainability: a reference framework for academic program development," *Sustainability science*, vol. 6, no. 2, pp. 203–218, 2011.
- [12] M. Rieckmann, *Die globale Perspektive der Bildung für eine nachhaltige Entwicklung: eine europäisch-lateinamerikanische Studie zu Schlüsselkompetenzen für Denken und Handeln in der Weltgesellschaft [The Global Perspective for the Education of Sustainable Development. Key Competencies for Thinking and Acting in the World Society]*. J. BWV Verlag, 2010, vol. 7.
- [13] —, "Future-oriented higher education: Which key competencies should be fostered through university teaching and learning," *Futures*, vol. 44, no. 2, pp. 127–135, 2012.
- [14] Unesco, "Global citizenship education: Topics and learning objectives," 2015.
- [15] A. Scheunpflug, "Global learning: Educational research in an emerging field," *European Educational Research Journal*, vol. 20, no. 1, pp. 3–13, 2021.
- [16] "Association of international educators. (2019). International student economic value tool." <https://www.nafsa.org>, accessed March 24, 2022.
- [17] "Institute of international education. (2019, november 13). Open doors 2019." <https://www.iie.org/Research-and-Insights/Publications/Open-Doors-2019>, accessed March 24, 2022.
- [18] "Association of international educators. (2015). The ebb and flow of internationalization: Demographics, rankings, and other pressures on higher education." <https://www.researchgate.net/publication>, accessed March 24, 2022.
- [19] M. M. Siczek, "Developing global competency in us higher education: Contributions of international students." *CATESOL Journal*, vol. 27, no. 2, pp. 5–21, 2015.
- [20] J. Ramaley, "Global learning in a new era," *Higher Learning Research Communications*, vol. 6, no. 2, p. 6, 2011.
- [21] N. H. Granholm, "Global imperatives of the 21st century: The academy's response," *Perspectives on Global Development and Technology*, vol. 12, no. 1-2, pp. 162–178, 2013.
- [22] J. S. Coker, R. Haskell, and T. Nelson, "Teaching global studies to all undergraduates: A required first-year course," *Perspectives on Global Development and Technology*, vol. 13, no. 1-2, pp. 267–280, 2014.
- [23] S. Liu and G. Dall'Alba, "Learning intercultural communication through group work oriented to the world beyond the classroom," *Assessment & Evaluation in Higher Education*, vol. 37, no. 1, pp. 19–32, 2012.
- [24] L. Ferreira-Lopes, I. Elexpuru-Albizuri, and M. J. Bezanilla, "Developing business students' intercultural competence through intercultural virtual collaboration: A task sequence implementation," *Journal of International Education in Business*, 2021.
- [25] M. Kurek and A. Mueller-Hartmann, "Task design for telecollaborative exchanges: In search of new criteria," *System*, vol. 64, pp. 7–20, 2017.
- [26] B. Leask, *Internationalizing the curriculum*. Routledge, 2015.
- [27] "UC DAVIS," <https://fys.ucdavis.edu/global-learning-seminars>, accessed March 24, 2022.
- [28] W. Westphal, "Bringing global and local together: Engaging with local communities to promote global learning," 2020.
- [29] E. Koehn, "Collaborative learning in engineering classrooms," in *2000 Annual Conference*, 2000, pp. 5–148.
- [30] S. Bhat, S. Bhat, R. Raju, R. D'Souza, and K. Binu, "Collaborative learning for outcome based engineering education: A lean thinking approach," *Procedia Computer Science*, vol. 172, pp. 927–936, 2020.
- [31] R. M. Marra, L. Steege, C.-L. Tsai, and N.-E. Tang, "Beyond 'group work': an integrated approach to support collaboration in engineering education," *International Journal of STEM Education*, vol. 3, no. 1, pp. 1–15, 2016.
- [32] J. J. Cupak and V. V. Riabov, "Applying 'flipped classroom' methodology in computer science courses," *Rivier Academic Journal*, vol. 13, no. 2, pp. 1–6, 2017.
- [33] P. Resta, C. Awalt, and M. Menchaca, "Self and peer assessment in an online collaborative learning environment," in *E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education*. Association for the Advancement of Computing in Education (AACE), 2002, pp. 682–689.