



Intercultural Exchange for Sustainable Futures: A GNL Course Connecting University Students in Germany and the United States

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Abstract

The purpose of this article is to describe and report on a Globally Networked Learning (GNL) course among students in Germany and the United States. Specifically, we examine how GNL is an innovative method for international virtual exchange, which contributes to meaningful intercultural communication through more equitable access to international experiences for undergraduate students. The focus for this GNL course was the United Nations (2015) Sustainable Development Goals (SDGs). The SDGs are a set of 17 international policy goals introduced by the United Nations in 2015 with the vision of achieving a harmonious and thriving world for everyone by 2030. The SDGs provided the international discourse platform for the development of global awareness and intercultural communication among university students. The study found that the GNL helped to facilitate international research collaboration on the SDGs and helped developed global competencies among the participants.

Keywords: Critical Cosmopolitan Theory (CCT); Globally Network Learning (GNL); intercultural awareness; Sustainable Development Goals (SDGs); virtual exchange

Introduction

In 2015, the United Nations established the Sustainable Development Goals, which are known as the SDGs for short. The SDGs comprise 17 goals for achieving a healthier and more sustainable world by the year 2030. In particular, the SDGs are designed to increase action in five key areas: (1) people, (2) planet, (3) prosperity, (4) peace, and (5) partnership (Byker, 2022). Despite the SDGs' global significance, many people—including university undergraduate students—remain uninformed about these goals and their target areas (Byker & Sadula, 2022). Therefore, educating undergraduates as global citizens requires opportunities to engage in global competencies, such as investigating the world, recognizing perspectives, communicating ideas, and taking action (Boix Mansilla & Jackson, 2012; Byker, 2013). Virtual international exchange fosters the development of global competencies through intercultural communication and project-based learning.

In this article, we describe a type of virtual exchange—called Globally Networked Learning (GNL)—with university students in Germany and the United States. GNL is “a collaborative approach to international virtual exchange that enables students and instructors from different locations around the world to participate in learning and creation of knowledge together” (Byker et al., 2023a, p. 49). The purpose of our GNL course was to engage students in an intercultural project-based learning experience about the SDGs. GNL provides a platform for intercultural exchange and collaboration through a virtual medium. GNL shrinks geographical boundaries and expands the opportunities for

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broadening knowledge about the world and increasing intercultural awareness. Virtual exchange supports the confluence of global citizenship through a discourse and inquiry about building a better world (Bethune, 1951; Bacak & Byker, 2021; Byker & Sadula, 2022). The purpose of our article is to examine and report on the impact of the GNL course experience among university students in relation to engaging in collaborative research about the SDGs.

Theoretical Framework

We situate and frame the purpose of the study in Critical Cosmopolitan Theory (Byker, 2013, 2016; Byker & Putman, 2019). Critical cosmopolitanism is an orientation for investigating initiatives like the SDGs. Critical Cosmopolitan Theory, which is also known as CCT, is a framework for the development of global competencies and intercultural awareness through reading and rewriting the world (Freire, 1970). CCT is situated in Kwame Appiah's notions about cosmopolitanism. Appiah (2006) asserts that human beings are fellow citizens of the world. CCT also connects the Asia Society's global competencies framework (Boix Mansilla & Jackson, 2012) with Paulo Freire's (1970) concept of conscientization or critical consciousness. The Asia Society's four global competencies are: (1) investigate the world, (2) recognize perspectives, (3) communicate ideas, and (4) take action. In a nutshell, CCT explains how the development of global competencies and intercultural awareness is part of the "symmetry of knowledge and skills to act critically as a citizen of the world" (Byker, 2016, p. 265). See Figure 1 below for a model of CCT.

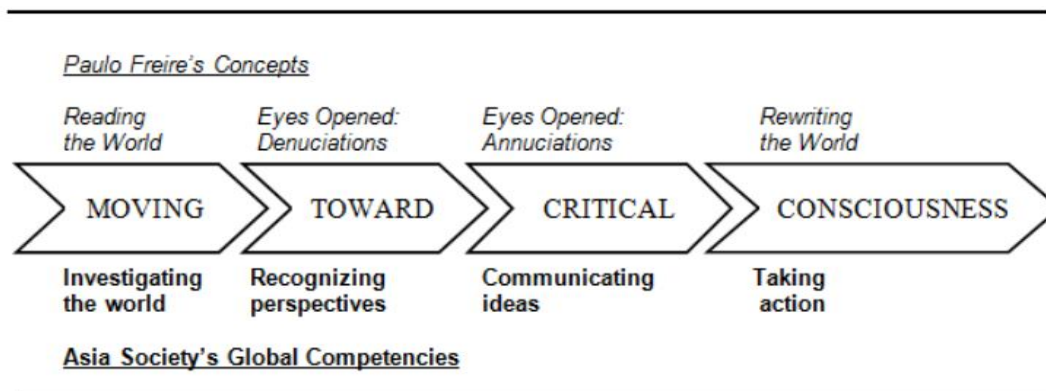


Figure 1. Conceptual Model of CCT

CCT Explained

As Figure 1 illustrates, CCT depicts the movement toward critical consciousness of the world as an interrelationship among the development of global competencies and having one's eyes open to the world and to global issues that need a collective response from a global citizenry. In the context of GNL, we used CCT to frame and inform how the university students would collaborate and become critically engaged with global issues situated in the SDGs. Sustainable development is an area of global engagement for global citizens. There is a need for young people to understand the importance of sustainability (Byker & Holshouser, 2022). We assert that it is vitally important for university students to be aware of and engaged with issues of sustainability. Furthermore, CCT helps to equip university students to read and begin to rewrite the world (Freire, 1970) in more sustainable ways. It offers a worldview that values the old and the new; the local and the global. CCT does not advocate for a cosmopolitan identity to replace national or cultural identities (Kymlicka, 2004). Instead, CCT describes how people often hold multiple identities that are in flux depending on place and context (Byker, 2016; Byker et al., 2023b). Following this line of reasoning, CCT asserts that communities around the world are interconnected and interrelated. In this way, CCT does not replace the local for

the global, but instead illustrates how the local is already global (Boix Mansilla & Jackson, 2012). CCT equips students to move beyond the nationalistic centric thinking, move beyond stereotypes, and act on the SDGs through intercultural communication and the development of global competencies.

Methodology

We used a mixed-methods research design (Tashakkori & Teddlie, 2021) for this study. Tashakkori and Teddlie's (2021) mixed-methods research design integrates qualitative and quantitative approaches to provide a comprehensive understanding of the research questions. It emphasizes methodological pluralism, combining strengths of both methods for better insights. For example, we utilized a mixed-methods approach to the pre and post survey with a mix of Likert scale questions for quantitative data and open-ended responses to qualitative data. Specifically, our study examined the following research questions:

- RQ1: In what ways did the GNL participants interact with one another throughout the GNL course?
- RQ2: How does, if in any way, participation in the GNL course change the participants' perceptions of developing global awareness?

In relation to these research questions, we discussed and came up with a list of hypotheses that centered the inquiry and formed the potential outcomes for our study's investigation:

- Hypothesis 1: Students will benefit from a GNL course academically in terms of increasing knowledge about SDGs.
- Hypothesis 2: Students will benefit from a GNL course academically in terms of increasing their global awareness.
- Hypothesis 3: Students will benefit from a GNL course academically in terms of increasing their knowledge about technology.
- Hypothesis 4: Students will benefit from a GNL course personally in terms of increasing their attitude towards international and intercultural cooperation.

These hypotheses were informed by the previously discussed CCT theoretical framework, which is grounded in Freire's (1970) concept of critical consciousness through reflection and dialogue even in virtual ways. The hypotheses are further supported by Boix-Mansilla and Jackson's (2012) assertion that structured, collaborative learning environments can deepen students' engagement with global issues and help develop global competencies. Prior studies on intercultural and virtual exchange initiatives confirm that such programs are effective in increasing intercultural awareness through collaboration and exchange (Baker, 2012; Byker & Sadula, 2022; Byker et al., 2023a, 2023b; Hoff & Medina, 2022; Mitchell et al., 2019). These research studies help to further validate and provide the literature support for the development of Hypotheses 1 through 4.

We address the outcomes of these hypotheses in the discussion section of our chapter. After receiving Institutional Review Board (IRB) approval from the university, we collected data as part of this GNL study. All the IRB ethics guidelines were followed in relation to the data collection, data analysis, and the reporting of the study's data. For example, none of the study's data were analyzed until after the GNL course was completed, the semester was finished, and final grades were posted. We acknowledged that with any type of qualitative research there is a potential for bias in participant responses. Participant data were deidentified according to the IRB protocol and findings reported using pseudonyms. There were two sources of data for the case studies: artifact analysis and students' responses on pre-survey and post-survey questionnaires. The artifacts were derived from the students' participation in the GNL course. These artifacts included: an Executive Summary paper, a research poster, and reflections on an interactive white board called Jamboard. Here are more details about each artifact:

- **Executive Summary paper:** Students collaboratively wrote an executive summary paper comparing the progress that Germany and the United States were making on their selected Sustainable Development Goal (SDG). The executive summary paper included an introduction to the SDG, a background and context section for each country, and a comparative findings section about each country's progress on the SDG.

- **Research poster:** After writing the Executive Summary, the student groups organized the findings of their paper into a research poster. They presented these research posters at a virtual research conference hosted at a university in this study.

- **Jamboard reflections:** As a reflective activity, students posted on an interactive whiteboard, their responses to the following question prompts:

- What did you learn from this GNL experience?
- What do you think about the global relevance of participating in a GNL project like this?
- What is the relevance for yourself as a university student?
- What is the relevance for your future career?

The pre and post surveys included association type of question, demographic information, Likert scale questions, and open-ended responses. Each survey included 21 question items. The pre and post surveys had similarly worded questions to capture any changes in the students' perceptions related to the impact of the GNL course. For example, students responded to a Likert Scale question about their knowledge of the Sustainable Development Goals before and after participating in the GNL. The participants in the study were recruited using convenience sampling. The sample's population came from the GNL course that the authors taught and facilitated together in a virtual way. Both instructors have had five years of experience in delivering online courses and in using collaborative digital platforms to facilitate Globally Networked Learning. To ensure consistency in course delivery, the instructors participated in joint planning sessions to align their pedagogical approaches. These sessions included workshops on intercultural competency and strategies for fostering meaningful student engagement.

Comparative and international perspectives about the Sustainable Development Goals was the main topic for this GNL course. As a group, the students had limited knowledge about the SDGs. There was not a prerequisite for the course and the students were mostly at the sophomore (Year 2) or junior (Year 3) level of their undergraduate education. In total, there were a total of 61 university students ($n = 61$) in this study. Of that 61, there were 26 students from Germany ($n= 26$) and 35 students from the United States ($n=35$). We acknowledge that the sample size makes generalization difficult. Our purpose was not to generalize the findings nor to make universal claims about GNL. A larger sample with student groups from different countries could have led to stronger and more comprehensive results.

Data Analysis

We examined the qualitative data using Miles et al.'s (2018) three-step interpretive approach and the constant-comparative method. First, we read and re-read the data and coded data as part of the data reduction. We marked the frequencies in the data in order to establish patterns related to the codes. Second, we created visual displays of the data to further analyze and synthesize the codes into categories. Third, we drew conclusions from the larger categories in the data in order to identify the themes emerging from the findings. The quantitative analysis was at a descriptive level. Descriptive statistics were analyzed to identify the participants' demographics and perceptions about the GNL course. Descriptive statistics summarize and organize quantitative data, providing insights into trends, patterns, and percentages of the data collected on the pre and post survey. The descriptive statistics reported in this article show the variability of responses on the Likert scale questions in the pre and

post surveys. The combination of the qualitative and quantitative data analysis approaches allowed for a robust and holistic understanding of our research questions.

Findings

In this findings section, we report on the findings of our research questions. The first question inquired about the ways the GNL student interacted with one another throughout the GNL course. The second question was focused on the GNL students' perceptions of the impact of participating in the GNL course.

Research Question 1: Global Interactions

For this GNL course, the students across the two universities were divided into SDG Groups. They were required to meet at the 4 scheduled webinar times and 2 additional times during the GNL course. Webinars were a central component of the GNL course. Each webinar lasted approximately 60 minutes and was structured around specific objectives, including group discussions, progress updates on SDG-related projects, and interactive activities to deepen students' understanding of global competencies. Prior to each webinar, students were required to complete preparatory tasks, such as reviewing relevant materials or drafting initial project outlines. These structured webinars fostered focused collaboration and helped students remain on track with their projects. We found that the participants reported that these regular meetings helped their SDG Group to better collaborate, track their progress, and work together on the writing assignments. The students also recognized the importance of ongoing communication and collaboration among their group. We also found that many of the SDG groups met more than the required two times outside of the scheduled webinars. This indicated a high level of engagement and commitment among the SDG groups. Many of them went above and beyond the course's minimum requirements, which reflected a strong dedication to achieving the course's goals and objectives. It also suggests that the groups found value in these extra meetings, which motivated them to meet more frequently. The choice of communication platforms, such as WhatsApp or Zoom, indicated the flexibility and adaptability of the SDG groups.

They opted for digital tools that facilitate virtual meetings, allowing them to overcome geographical barriers and enabling convenient communication. Furthermore, since WhatsApp and Zoom are widely accessible and user-friendly, they are suitable choices for groups with diverse members. The average duration of 30 minutes per check-in meeting suggested that these meetings were concise and focused. This efficient use of time aligns with the often-busy schedules of students and ensures that meetings remain productive. Additionally, shorter and more focused meetings can help maintain engagement and prevent participants from feeling overwhelmed. Finally, over 93% of the groups strongly agreed or agreed that the check-ins were helpful for increasing the interaction/participation of the group. This high level of agreement among the groups underscores the value and effectiveness of the additional check-in meetings. When participants strongly agree or agree that these meetings were helpful, it indicates that they found them beneficial in achieving their goals. Increased interaction and participation within the groups are positive outcomes, as they can lead to better collaboration, intercultural communication, idea sharing, and progress toward the SDGs. We asked students to share their experience using Google Jamboard and let us know what they took away from the GNL experience. In order to analyze the distribution of ideas and beliefs, we divided their responses into categories and subcategories (see Table 1).

As Table 1 illustrates, within the category of Global Awareness & Cultural Knowledge, "World Knowledge / Stereotypes" has the second highest count of student responses. It suggests a significant focus on general global knowledge and possibly stereotypes. The higher number could be attributed to the broad nature of this category, encompassing a wide range of information about the world. The subcategory of "Different Peoples" has the highest count, indicating a notable emphasis on

understanding various ethnic or national groups. The high number might be because recognizing and appreciating diversity in different peoples is considered essential for global awareness. “Different Cultures” has a slightly lower count than “Different Peoples.” It suggests a focus on cultural differences and nuances.

Table 1.

Distribution of Reflection Responses on the Jamboard

Global Awareness & Cultural Knowledge	107	35% of total	
World knowledge / stereotypes	26	24%	9%
Different peoples	28	26%	9%
Different cultures	22	21%	7%
History	1	1%	0%
Language	4	4%	1%
Own culture	16	15%	5%
Other culture	10	9%	3%
Competencies	161	53% of total	
Personal skills / knowledge / communication	53	33%	17%
Learning for life (SDGs)	35	22%	12%
Learning for career	9	6%	3%
Technology	10	6%	3%
Peer-learning	30	19%	10%
Being globally competent	24	15%	8%
Career Related	35	12% of total	
Own teaching skills	7	20%	2%
Student / Classroom related	15	43%	5%
Other-career related		43%	5%
Total	303	100%	

The count may be lower due to a more specific focus compared to the broader concept of “peoples.” The extremely low count in the “History” subcategory suggests a limited emphasis on historical knowledge within the context of global awareness. This might be a specific choice based on the purpose of the assessment or the intended focus on contemporary aspects rather than historical perspectives. The subcategory of “Language” indicates a moderate emphasis on language as an element of global awareness. The count may be lower compared to other subcategories because language, while important, might be perceived as just one aspect of cultural knowledge. Comparing “Own Culture” and “Other Culture”, this subcategory suggests a substantial emphasis on understanding and being aware of one's own culture. The higher count might be due to the recognition that self-awareness is fundamental to developing a broader understanding of global awareness and cultural knowledge. “Other Culture” has a lower count compared to “Own Culture.” It implies a focus on understanding cultures other than one's own. The count may be lower as it might be perceived as more challenging to grasp and appreciate cultures different from one's own.

Thus, the distribution of numbers suggests a comprehensive approach to global awareness, with an emphasis on understanding different peoples, cultures (both own and others), and to a lesser extent, language. The variation in counts may reflect the perceived importance or complexity of each subcategory within the overarching theme of global awareness and cultural knowledge. The category of Competencies, “Personal Skills / Knowledge / Communication” had by far the highest count. This indicates a significant emphasis on personal development, knowledge acquisition, and communication

skills. The higher number may be attributed to the recognition of the importance of these skills in various aspects of life. “Learning for Life (SDGs)” with the second highest count suggests a focus on learning in alignment with SDGs. The higher number may reflect a commitment to education that contributes to global sustainability and addressing societal challenges. Furthermore, the count in “Learning for Career” is relatively lower compared to others. It implies less emphasis on learning specifically for career development.

The count in “Technology” also suggests a moderate emphasis on technological competencies. The count may be lower compared to personal skills and learning for life, possibly indicating that while technology is important, it is not the primary focus. Not surprising in a course where collaboration is deeply embedded, “Peer-Learning” has a considerable count, indicating a recognition of the value of learning from peers. The higher number may be attributed to the acknowledgment that collaborative learning and shared knowledge contribute significantly to personal and professional growth and leads to the idea of “Being Globally Competent”. This subcategory also has a substantial count, suggesting a focus on developing competencies that enable individuals to navigate and thrive in a global context. The count may be lower than personal skills because being globally competent may encompass a subset of broader personal skills.

Research Question 1 Summary

In summary, the distribution of numbers within the superordinate category of "Competencies" reflects a balanced emphasis on personal skills, learning for life, and peer-learning. There is a noticeable focus on being globally competent, indicating a recognition of the importance of skills and knowledge in a globalized world. The lower counts in learning for career and technology suggest a specific emphasis in this assessment, possibly valuing holistic personal development over narrowly focused career-related or technological skills. Finally, students also seemed to relate this course’s content and experience to their careers. With only 12% of all utterances, the count is rather low, but nevertheless important. When thinking about their “Own Teaching Skills” students put limited emphasis on personal teaching skills within the context of career-related competencies. The lower number might suggest teaching skills are considered less central to the career-related aspect being assessed. When it comes to “Student / Classroom Related” issues, this subcategory has a moderate count, indicating students put emphasis on skills and knowledge related to their future careers as teachers and how they can influence students and classroom dynamics. The higher number may be attributed to the understanding that effective engagement with students and managing classroom-related challenges is crucial in many career paths outside of teacher careers.

Finally, “Other Career-Related” also has a count of 15, like “Student/ Classroom Related”. It suggests a balanced focus on a range of career-related competencies beyond teaching and classroom management. The equal count may imply that the assessment considers these two aspects equally important within the broader career context. To conclude the part on the findings from research question 1, we note that the distribution of numbers within the superordinate category of "Career Related" suggests a balanced approach. There is a moderate emphasis on both student/classroom-related skills and other career-related competencies, with teaching skills having a lower count. This distribution may be that leadership and collaboration are part of a broader set of career-related competencies, which includes future teaching practices.

Research Question 2: Student Perception

Our second research question focused on the students’ perceptions of participating in the GNL course. Using pre-and post- surveys, we invited students to state their opinion on several statements in relation to the GNL course. As previously discussed, the course included pre- and post-surveys administered to students. These surveys were designed to capture changes in perceptions related to

intercultural communication, global awareness, and attitudes toward the SDGs. Both surveys included demographic questions, Likert-scale items, and open-ended questions. This data was crucial for evaluating the impact of the GNL course and testing our hypotheses. In this section, we report on their perceptions using visual data displays. The charts show a significant change in attitude, knowledge, and awareness before and after attending the GNL course. For example, Figure 2 shows the terms the students associate with the word “global”.

Figure 2. Terms Associated with the Word Global

Figure 2 shows only those terms with the highest number of occurrences. The percentage associated with “communication” more than doubled after attending the course. This suggests that the course may have had a significant impact on students' perceptions of the role of communication in a global context. The same can be seen for “culture”. The percentage associated with that term increased noticeably after attending the course. This suggests that the course may have had a positive impact on students' awareness and appreciation of cultural aspects. This could be traced back to the forming of international teams and the need to collaborate as such a team.

Key terms about skills and knowledge remained relatively stable. It indicates that the course may not have significantly altered students' initial perceptions regarding the importance of skills and knowledge in a global context. Lastly, the percentage associated with "world" decreased after participating in the GNL experience. This shift might indicate a re-evaluation or refinement of students' conceptualization of the term "global," possibly focusing more on specific cultural or contextual elements rather than a broad global perspective. Overall, the data indicates that the GNL course had a notable influence on students' perceptions. There was an increased emphasis on communication and culture, suggesting that the course may have effectively enhanced students' understanding of the importance of effective communication and cultural awareness in a global context. The decrease in the percentage associated with "world" may signify a more nuanced or focused view of global concepts, possibly emphasizing specific cultural and communicative dimensions.

Figure 3. Perceptions on the Importance of a Global Understanding

As students are part of a global community, we were interested in seeing how they gauge international developments. As Figure 3 illustrates, there is a notable increase in the percentage of students who strongly agree that it is important to have a strong global understanding after attending the course. This indicates that the course likely had a significant impact on reinforcing or strengthening students' conviction regarding the importance of global understanding. At the same time, the percentage of students who agree decreased substantially after attending the course. While there is still agreement, the decrease suggests a potential shift in the level of certainty or conviction, possibly indicating a more nuanced understanding or a refinement of views and thus students chose to strongly agree after attending the course. The combined percentage of students who were neutral, disagreed, or strongly disagreed was already very low before attending the course, and this percentage became zero after the course. This suggests that the course may have effectively addressed any ambivalence or disagreement regarding the importance of global understanding. The data thus indicates that the GNL course had a positive impact on students' perceptions of the importance of having a strong global understanding. There was a significant increase in the percentage of students who strongly agree, suggesting that the course played a role in reinforcing the significance of global awareness and understanding in the minds of the participants. The decrease in the percentage of those who agree might indicate a more refined or critical perspective about global understanding gained through the course.

In a global world, students should show skills and knowledge that help them to operate efficiently and successfully in international teams. Thus, we wanted to know how much value students bestow upon an international experience during their studies and whether they think it could be of value for their careers. Figure 4 shows how there is a significant increase in the percentage of students who strongly agree that participating in international experiences is important and applicable to their future careers. This suggests that the course had a positive impact on reinforcing or strengthening students' beliefs about the significance of international experiences. The percentage of students who agree decreased after attending the course. While there is still agreement, the decrease indicates a more nuanced understanding or a refinement of views, possibly due to a deeper exploration of the topic during the course and thus a shift towards strong agreement. The combined percentage of students who were neutral, disagreed, or strongly disagreed was already low before attending the course and became zero after the course. This suggests that the course may have effectively addressed any ambivalence or disagreement regarding the importance of international experiences in future careers.

Figure 4. Perceptions on Participating in International Experiences

Research Question 2 Summary

In summary, the data indicates that the GNL course had a positive impact on students' beliefs about the importance of participating in international experiences for their future careers. There was a significant increase in the percentage of students who strongly agree with this statement (see Figure 4) suggesting that the course played a role in reinforcing the significance of international experiences in shaping their career perspectives. Likewise, the participants recognized the importance of technology as a tool for mediating the international experience. Digital technologies are already a very important part of the lives of many students and can help to facilitate international collaborations. The data overall suggests that the GNL course had a substantial impact on students' use of technology for communication. There is a clear increase in the frequency of technology usage, with a significant decrease in the percentage of students who reported using technology only sometimes. This shift indicates that the course likely emphasized the role of technology in effective communication of ideas about the world, leading to a more frequent and intentional adoption of technology for this purpose among the participants.

Discussion

We begin this section with an examination of the findings related to our four-stated hypotheses in the methodology section. The GNL course has proven to be a transformative educational experience, blending academic engagement and personal development. The data suggests strong evidence for each hypothesis and the following paragraphs draw insights not only from the data analysis but also from the perspectives shared by participating students during the Jamboard activity. We will discuss each of our four hypotheses in greater detail.

Hypothesis 1: Increasing knowledge about SDG. Our first hypothesis centered on the academic growth of students, particularly in understanding the SDGs. The "Competencies" superordinate category, with a focus on the subcategory "Learning for Life (SDGs)," exhibited a significant emphasis during the course. The data, with a noteworthy increase (more than double) from 32.41% to 75% in the "Strongly Agree" category regarding the importance of having a strong global understanding, aligns seamlessly with the hypothesis. Student statements also offer insights into the impact of the course. One student expressed, "As someone who is not able to study abroad, I value this experience a lot." This sentiment underscores the course's success in providing an invaluable international perspective to students who may face constraints in studying abroad. It reflects a broader

commitment to making global knowledge accessible to all, contributing to the democratization of education.

Additionally, as one student wrote, "I learned how to step back. I used to try to do all the work by myself and not trust others, but I really stepped back. These are big issues that need many to achieve." This revelation showcases a shift in the student's approach to collaborative work and hints at the development of skills vital for addressing complex global challenges, including those related to SDGs. The student perspectives, when intertwined with the data, show a comprehensive idea of the academic benefits derived from the GNL course. The course not only imparts knowledge about SDGs but also fosters a collaborative mindset, preparing students for real-world problem-solving scenarios.

Hypothesis 2: Increasing their global awareness. The second hypothesis focuses on enhancing students' global awareness, while drawing from subcategories such as "Different Peoples," "Different Cultures," and "Being Globally Competent" within the "Global Awareness & Cultural Knowledge" superordinate category. The data reflects a substantial increase from 42.37% to 75% in the "Strongly Agree" category regarding the importance of a strong global understanding.

Student testimonials provide a deeper understanding of the impact of the course on their global awareness. One student shared, "It was a great opportunity to get in touch with students from another country & to be able to experience a new way of working/ learning." This statement illustrates how the course fosters a global perspective by facilitating interactions with diverse groups, enhancing cultural understanding, and broadening students' horizons.

Furthermore, another student emphasized the significance of the human connection, stating, "It is a good thing to connect with people from other countries, but it is way more effective to meet in person. It was hard for our group, as internet connections weren't as stable." This perspective acknowledges the importance of personal connections in global awareness, even as it highlights the challenges posed by technological limitations. It underscores the course's efforts to create a meaningful virtual global experience while acknowledging the inherent value of face-to-face interactions. The student perspectives and the data affirm the success of the GNL course in fostering global awareness. The course not only imparts theoretical knowledge but also provides practical experiences that deepen students' understanding of different cultures and perspectives.

Hypothesis 3: Increasing their knowledge about technology. The third hypothesis places a spotlight on technological knowledge within the "Competencies" superordinate category, especially focusing on the subcategory "Technology." The data shows a positive shift, with the percentage of students using technology "Always" or "Most of the time" for communication rising from 54.23% to 87.5%. Moreover, another student's statement reflects a broader perspective on the intersection of technology and global collaboration: "This is important for me as a student because I need to learn how to work well with others. Especially, when the world is shrinking because of tech." This acknowledgment of the shrinking world due to technological advancements highlights the course's commitment to preparing students for a future where technology is integral to effective communication and collaboration.

The overlap of these student perspectives with the data signifies a successful integration of technological competencies into the GNL course. The course not only imparts theoretical knowledge about technology but also equips students with practical skills, preparing them for the demands of the modern workforce.

Hypothesis 4: Increasing international and intercultural cooperation. The fourth hypothesis revolves around personal development, particularly in cultivating positive attitudes towards international and intercultural cooperation. The "Global Awareness & Cultural Knowledge" superordinate category, with a focus on subcategories such as "Different Peoples," "Different Cultures," and "Being Globally Competent," witnessed a substantial increase from 50% to 75% in the "Strongly Agree" category. Student statements provide deeper insights into the transformative impact

of the course on personal attitudes. One student shared, "At first, I thought I already was competent, but this project solidified that." This revelation indicates a significant shift in the student's self-perception, emphasizing the course's role in reinforcing and solidifying their competence in navigating diverse and global contexts.

Moreover, the student highlighted the broader implications for their career, stating, "It is important in my career because if I cannot work well with people different from me, I could never keep a job. Collaboration is necessary for every career, even STEM." The term STEM is an acronym meaning Science, Technology, Engineering, and Mathematics. This recognition of the importance of intercultural cooperation in diverse careers underscores the course's impact on shaping students' attitudes beyond academic realms. Comparing student perspectives with the data provides a holistic view of the GNL course's success in fostering positive attitudes towards international collaboration. The course not only imparts theoretical knowledge but also creates a mindset conducive to effective collaboration across cultural boundaries.

Benefits for Teaching Practice

We have found our GNL course to not only to be important for facilitating international research collaboration on the SDGs, but it also provided ways for teacher candidates to enhance their future teaching practices. This is particularly true for the students who were preparing to become world language teachers. For example, most of the German students in the GNL course were preparing to become teachers of English in Germany's public schools. In relation to the benefits to future teaching practice, the GNL course provided future teachers with ways to practice intercultural communication and build global competencies. In the context of teaching English as a second language, GNL fostered a communicative approach (Mitchell et al., 2019) to discuss the SDGs. The communicative approach to language learning centers on learning language through natural forms of communication and group discussion. This approach to teaching language posits that language is best learned through communication (Mitchell et al., 2019). Engaging in virtual conversations with speakers of the target language allows them to refine their language skills in real-world contexts. For English language teachers, this is particularly beneficial as it enables them to model authentic language use and intercultural nuances for their future students. GNL thus acts as a bridge between theory and practice, allowing teacher candidates to apply their language skills in meaningful intercultural forms of communication.

The GNL course also exposed teacher candidates to diverse perspectives and teaching methods. Through online collaboration and interaction, the teacher candidates in this study were able to build their network of intercultural educators committed to internationalization (Byker & Thomas, 2021; Byker & Sadula, 2022). We believe that such a network supports the teacher candidates' development of various teaching strategies—including opportunities for international virtual learning and virtual exchange. Developing a network of intercultural educators fosters deeper global perspectives that are valuable assets to expand teacher candidates' portfolio of practices. For example, cultural responsiveness and the ability to adapt their teaching styles to be responsive to a diverse student population is an essential asset to teaching practice. Additionally, the promotion of inclusivity and intercultural communication are equally valuable.

Furthermore, we also found how the GNL course facilitated the opportunity for extended collaboration. Teacher candidates need to know how and get practice with working in diverse teams. Global collaboration through the GNL course provided the teacher candidates in this study with authentic opportunity to work and learn together in a team. Part of this teamwork includes negotiating and being accountable to the GNL course assignments. We would like to add that the collaborative team working as part of the GNL course also offered the potential for the creation of a global learning community. Teacher candidates did not have the opportunity to collaborate on the SDG research

process, they were able to share and discuss resources as well as engage in reflective discussions about the SDGs. This sense of global community fosters a supportive network of interconnectedness can help to advance intercultural exchange and further enhance the importance of collaboration in teaching.

We found many benefits related to this GNL course and the development of teaching practices. The exposure to communicative forms of collaboration, the exchange of diverse perspectives, and opportunities for intercultural exchange equips teacher candidates with the skills and knowledge necessary to create inclusive and effective learning environments. As the world becomes increasingly interconnected, GNL is a powerful conduit for teacher candidates to advance global education while preparing their future learners' success in an ever-changing, multicultural world.

Intercultural Development

As scholars have explained, intercultural awareness is the ability to think and act in empathetic ways in order to try and understand another person's culture (Baker, 2012; Byker & Putman, 2019; Hoff & Medina, 2022). Intercultural awareness can be considered as the foundation of communication. Baker (2012) further defines how intercultural awareness involves two qualities: one is the awareness of one's own culture; the other is the awareness of another culture. The development of intercultural awareness also is reflected in student learning outcomes for international experiences, which includes: "Engaging with cultural similarities and differences and critically reflecting on one's own cultural situatedness" (Hoff & Medina, 2022, p. 343). In relation to this GNL course, we found that students developed their intercultural awareness as they increased their time and interaction with each other in small groups. As their communication and interactions increased so did their intercultural awareness.

There was a greater recognition, as well, as to how progress on the SDGs requires intercultural exchange and a global sense of collaboration. This was echoed in the perception shared by the participant who stated, "I learned concept how to step back. I used to try to do all the work by myself and not trust others, but I really stepped back. These are big issues that need many to achieve." Related to this quote, we close this section with the following statements that show the impact of the GNL project on intercultural development. First, students developed interculturally through and evolved understanding of effective communication. Before the GNL course, students connected the concept of effective communication with vague notions about respectful communication across cultures (Zheng, et al., 2022). After the GNL course, the students were more specific and had a more nuanced understanding of communication. Students stressed the importance of informed and collaborative ways of communicating as well as respectful communication cross- culturally. Second, the students developed interculturally through a greater emphasis on collaboration and goal achievement. In their pre-course survey responses, students connected communication to an exchange of ideas, but there was less emphasis on collaboration for achieving common goals. In the post-course survey, though, there was a clear shift to the recognition of intercultural communication as a collaborative effort to achieve shared objectives and to make progress on the SDGs even with cultural differences. Third, the students developed interculturally through a shift toward a global discourse and exchange of views. In their pre-course responses, the students hinted at the exchange of ideas between different countries, but engaging in a discourse was not as explicit (Zhang & Pearlman., 2018). In the post-course survey, students described intercultural communication as a global discourse involving the exchange of views, suggesting a broader perspective on the role of communication on a global scale. Freire (1970) how discourse is part of the robust notion of the word dialogue. To dialogue means to engage in a discourse that includes critical thinking about the world and perceives reality as a process of transformation rather than something static and unmeaningful (Freire, 1970, Byker & Sadula, 2022). We found that this GNL course helped students to develop interculturally as they engaged in a vibrant discourse on the SDGs through comparative and international research.

Conclusion

In sum, the GNL course emerges as a powerful catalyst for holistic education, integrating academic knowledge with personal development. The analysis of student perspectives offers a better understanding of the course's impact on individuals. The course effectively addresses the academic objectives, imparting knowledge about the SDGs and fostering global awareness. Student statements validate the success of these academic pursuits, illustrating how the course provides a unique international perspective, even for those unable to study abroad. Additionally, the course excels in integrating technological competencies into its framework, recognizing the vital role of technology in facilitating global collaboration. Student testimonials underscore the course's success in preparing students for a technologically advanced future where effective communication is key. Most notably, the GNL course stands out in its impact on personal development, shaping positive attitudes towards international and intercultural cooperation. Student perspectives reveal a transformative journey, from questioning personal competence to recognizing the broader career implications of intercultural collaboration. In conclusion, the GNL course exemplifies a paradigm of education that goes beyond traditional academic boundaries. It equips students not only with knowledge but also with the skills and attitudes necessary for success in a globalized world. The combination of data analysis and student perspectives paints a comprehensive picture of the course's success in nurturing well-rounded, globally competent individuals.

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