

# Teaching Sustainable Development Goals through Virtual Exchange in Design Thinking Courses

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**Abstract:** The stated objective of the United Nation's Sustainable Development Goals (SDGs) are to serve as a shared blueprint for peace and prosperity around the planet. If this blueprint is to become a reality, the inclusion of the SDGs in university curricula is essential. Yet how can we be sure that we teach a unified and shared view of these goals? This paper examines the value of using virtual exchange in teaching the UN SDGs in Business School Design Thinking courses. Specifically, the experience of a partnered course run at both the Boise State University's College of Business and Economics and the Lebanese American University's Adnan Kassar School of Business serves as a case-study. Results from a survey of both student groups indicate that the experience of working with students from outside their home culture did improve their cross-cultural communication skills. Furthermore, learning about the SDGs was a valued experience. However, learning about the SDGs in collaboration with "foreign" team members was eclipsed by the broader experience of engaging with students outside their home culture.

**Keywords:** Design Thinking, Virtual Exchange, Sustainable Development Goals

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## 1. Introduction

Design thinking incorporates an approach well suited for coming to terms with complex, poorly structured problems. Accordingly, studies advocate that managers embrace a design perspective in their work by emulating the ways in which skilled designers deal with the tasks and problems they confront (Collopy and Boland, 2004; Brown, 2008). Responding to this call, several business schools revised their curricula to incorporate design thinking (Beckman and Barry, 2007; Boni, Weingart and Evenson, 2009; Kimbell, 2011; Liedtka and Ogilvie, 2011). The motivation for these changes is the recognition that design tools comprise ways of approaching, thinking about, and dealing with poorly understood problems – a task faced by every manager. Remarkably, design thinking strategies can, to a considerable extent, be taught in the form of cognitive approaches, methods, and techniques. The idea behind these curricular revisions is not to replace the all-important scientific and analytical approaches to business topics but to help impart an additional skill set with which future managers can handle complex business issues.

Another skillset that is often touted as missing among business graduates is that of good communication skills – with a particular need for better cross-cultural communication (Wardrope, 2002; Alshare, Lane and Miller, 2011; Lolli, 2013). Brink & Costigan (2015) even go so far as to note that business schools, in their drive to meet AACSB set standards, have inverted the real communication needs of employers by over-emphasizing presenting skills and under-emphasizing listening skills. In order to bridge this gap, the concept of virtual exchange or Collaborative Online International Learning (COIL) experiences entered the management education domain (Nava-Aguirre, Garcia-Portillo and Lopez-Morales, 2019).

Virtual exchange emerged in the 1990s as a way to enhance the world-view of university students through online partnered discussions, collaborative presentations or writing activities (O'Dowd and Lewis, 2016). Online intercultural experiences enable students to develop intercultural competence and communication skills by engaging with peers from different cultural backgrounds. Through this engagement, listening and conversing skills are emphasized in line with what employers seek (Brink and Costigan, 2015). Once students' perspectives expand to encompass the whole world, problems of global relevance become tangible. For this reason, the UN's Sustainable Development Goals make a good backdrop for virtual learning of cross-cultural communication skills in management design thinking courses (Heilmann, Philippart and Lessmann, 2023).

This paper examines the value of using virtual exchange in teaching the UN SDGs in Business School Design Thinking courses. Specifically, the experience of a partnered course run at both the Boise State University's College of Business and Economics and the Lebanese American University's Adnan Kassar School of Business serves as a case study. The remainder of this article is organized as follows. The next section provides background on the three course elements at the heart of this case study – design thinking, virtual exchange, and the UN

SDGs. Subsequently a methodology section describes key learning outcomes of the courses, how the students were partnered, the activity they were assigned and how feedback was solicited throughout the learning experience. The learning experience is then analyzed using both qualitative and quantitative methods. The paper concludes with a discussion of the implications for curricular design in management schools more broadly.

## **2. Background**

Calls for a business curriculum that balances between analytical and “soft skills” are not new. As early as 1967, Simon was also aware that the business school emphasis on a scientific, analytic curriculum left a deficit in the area of developing graduates with practical skills in synthesizing the knowledge gained. For a balance to be met, Simon held that design thinking and a codified design pedagogy should take its rightful place beside scientific pedagogy in business schools (Simon, 1967). In the present work, we extend this view on design thinking to introduce problems of global scale alongside the need to listen to those from outside one’s home environment. In this way we solidify the balance that Simon sought through experiential learning in a manner that serves to enable changing what currently exists into what is envisioned (Simon, 1996).

### **2.1 Design Thinking**

Design thinking is an iterative and interactive process blending analytic and creative tools in provision of solutions to wicked problems (Razzouk and Shute, 2012). As espoused by the Stanford d.School, the design thinking process follows five steps: Empathize, Define, Ideate, Prototype, and Test (Banerjee and Gibbs, 2016). By rapidly cycling through this process, design thinking allows for the provision of effective solutions to problems which is attractive to engineering and business domains. Part of the success of design thinking is due to the proper framing of the problem which comes from putting the “user” at the heart of the process from the very first step of “empathize”. This act of engaging with the “user” yields an excellent way to teach business students the key skills of listening and conversing (Panke, 2019).

The act of listening to and conversing with a user – another human being – can be difficult for students who have been trained to listen to faculty members speaking in a unidirectional manner. Nevertheless, the act of listening does have an important role to play in business curricula (Ferrari-Bridgers and Murolo, 2022). While design thinking is a key tool to improve critical listening, virtual exchange also provides another modality by which students can practice these skills.

### **2.2 Virtual Exchange and Cross-Cultural Learning Experiences**

Virtual exchange is not a new concept. In many ways, the tradition of having “pen pals” is an early form of virtual exchange. Moving into the realm of technology enabled cross-cultural or international exchange, there are two primary models of virtual exchange espoused in the literature: e-tandem and intercultural collaboration (O’Dowd, 2020). In the e-tandem model learners are assigned to partners or into discussions groups with the aim of serving in alternating mentor/mentee roles to support learning about the other’s culture, communication style, or language. In the intercultural collaboration model, the virtual exchange experience is integrated into the course material and classes are paired across universities such that learners work together to deliver a project in support of the course learning outcomes. In this paper, we describe an intercultural collaboration model of virtual exchange.

Within management curricula, the benefits of virtual exchange have been amply documented. Most notably in the study by Taras *et al.* (2013) who performed a multisource longitudinal study of 6,000 students engaged in a virtual exchange activity for two months. Their work reveals positive outcomes in learning, attitudes, and behaviors, among others. Similarly, Cheikhrouhou and Marchewka (2020) demonstrate the value of virtual exchange in entrepreneurship through a project partnering Polish and Tunisian university students to explore the similarities and differences between the two countries’ entrepreneurial ecosystems. Among the benefits noted was an increase in self-confidence. The key to a successful virtual exchange – following either model – is a topic to discuss or focus a project on; for this the UN Sustainable Development Goals are a natural choice.

### **2.3 Teaching and Learning Sustainable Development Goals**

The United Nations (UN) Sustainable Development Goals are seen very differently based on where someone is from, how they were raised, their personal experiences and their education level. Exploring these differences allows for new ideas on how to tackle these issues. As the UN SDGs serve as a framework for identifying and

addressing ethical and sustainability problems they can also serve improve societal awareness within business curricula (Fang and O'Toole, 2023).

The seventeen United Nations Sustainable Development Goals of the 2030 Agenda for Sustainable Development were officially adopted by world leaders on January 1st, 2016 (UN DESA, 2022). As the United Nations underlines, the SDG agenda is about transformative change, radical and simultaneous improvements in social justice, equality, and environmental sustainability (Holmes *et al.*, 2022). One of the things that all of the individual goals have in common is the extent to which each requires schooling and education for success. The work of schools is central to the achievement of the SDGs, not only when it comes to achieving SDG 4 (Quality Education), but also when it comes to achieving the other goals (Chiba *et al.*, 2021). The United Nations has identified higher education institutions as key to implementing the 2030 Agenda for Sustainable Development.

Design Thinking courses within business school curricula are the ideal place to insert the SDGs. Design thinking is particularly suited for driving innovation and dealing effectively with messy, ill-structured situations. Yet, to overcome those who believe that the SDGs are over ambitious and cannot be financed without unprecedented and improbable amounts of external assistance, the innovations designed to address the SDGs must make good business sense as well (Burnett, Lewin and Heyneman, 2022).

In this study, a design thinking class in the United States of America (USA) was partnered through virtual exchange with a design thinking class in Lebanon. The students were tasked with designing for a problem under one of the United Nations' 17 Sustainable Development Goals. The next section describes the structure of the courses and the design of the virtual exchange activity along with the survey strategy undertaken to measure the impact of the experience.

### 3. Methodology

As this research lays at the crossroads of education and innovation, the methodology applied is best labeled as a case study, but more in the tradition of Stake (1995) than Yin (2018). In that tradition, the virtual exchange experience forms the bounded system within which we focus on the experience of the individuals by probing their perceptions. To elucidate the bounds of our case study environment, we provide a full description of the two courses and the virtual exchange activity. Subsequently, we describe the data collection tools within the case framework which, as advocated by Stake(1995), remained flexible yet focused on issues of internationalization. In contrast, we also launched a pre- and post-survey based on the communications skills portion of the validated Science Student Skills Inventory more inline with the recommendations of Yin (2018). The blending of these two methodologies within a case study is acceptable within both the education and innovation sectors (Yazan, 2015; Goffin *et al.*, 2019).

At the heart of this study are the courses paired between the USA (College of Business and Economics, Boise State University) and Lebanon (Adnan Kassar School of Business, Lebanese American University). While both courses were undergraduate design thinking courses housed in AACSB accredited schools of business, the exact context and focus of the courses differ.

In Lebanon, the course, "Data-Driven Design Thinking", is offered as a business elective open to all undergraduate business students while also serving as a core course in the Data Analytics minor which is open to all majors. As such, the students who matriculate in the course span a diversity of majors including Computer Science, Bioinformatics, and all emphases of Business (Accounting, Banking and Finance, Family and Entrepreneurial Business Management, Information Technology Management, International Business, Management, Marketing). As the course is housed in the Data Analytics Minor the course learning outcomes focus on the use of data analysis within the design thinking process. Specifically, at the end of the Data-Driven Design Thinking Course, the graduate will be able to:

1. Execute each step of the design-thinking process.
2. Create a data pipeline to support the design-thinking process.
3. Create and execute a data analysis plan to achieve a stated goal within the design-thinking process.
4. Communicate effectively in cross-cultural teams.

In the USA, the course, "Design Thinking and Strategy", is offered as a special topics elective open to undergraduate business students. The course is popular among senior students as it leverages all aspects of their management education. In contrast to the data-focus of the design thinking course in Lebanon, the design thinking course at Boise State University focuses on the strategic management aspects of advancing the products or services designed. Specifically, the course not only defines "What" constitutes a sustainable competitive

strategy, but also emphasizes “How” managers can shape the evolution of such a strategy. In short, students study how they can facilitate the design of innovative products, processes and, ultimately, strategies for designing a new product or service for an unmet need, frustration or gap along with creating a functional, business-level, and corporate-level strategy business plan. At the end of the Design Thinking and Strategy course, the graduate will be able to:

1. Understand the Design Thinking process.
2. Use Design Thinking as a wicked multi-faceted problem-solving approach.
3. Compare the traditional sequential analytical linear problem-solving approach to the Design Thinking approach.
4. View business from multiple perspectives.
5. Understand the relationship between a firm's economic context, competitive environment, and strategic options.
6. Understand the need for growth and innovation in a business.

Given the core focus of both courses on the design thinking process, the virtual exchange experience was centered around analyzing the design of a product or service from the perspective of business strategy as mapped to the Hambrick Model. In order to make the cross-cultural communication aspect of virtual exchange relevant, the UN Sustainable Development Goals were chosen as a starting point for the students to identify a product or service to analyze. Specifically, the assignment required teams of students to (1) select one of the 17 UN SDGs, (2) design or select from the existing market a product or service targeted at the selected SDG, (3) prepare and deliver a presentation (via FlipGrid) analyzing the selected product or service business model using the Hambrick Diamond (Hambrick and Fredrickson, 2005), and (4) prepare and post responses to a set of self-reflection questions chosen by the students from a list of possible questions. Students were also required to respond, individually, via the FlipGrid discussion board to at least three other team presentation posts.

The student teams were assigned by the faculty members who worked to form the teams in such a way as to respect a balance between the two locations and genders. In Fall 2022, this led to ten teams – three teams with five members and seven teams with six members. Due to an imbalance in student numbers between BSU (42 students) and LAU (15 students), five of the teams had one student from LAU and five had two students from LAU.

A partnered version of both courses was run as a pilot in Fall 2021 before preceding to the more focused virtual exchange experience in Fall 2022. Similarly, the case study strategy also evolved from a set of reflective journal entries to a mixed method with a validated scale and open-ended questions administered in a pre- and post-survey format.

In order to capture changes in the students’ cross-cultural communication capabilities and their thoughts relative to the virtual exchange experience, a pre-survey and post-survey were administered. The pre-survey, issued one-week prior to the exchange experience, included eight questions adapted from the Science Student Skills Inventory (SSSI) relative to communication (Mercer-Mapstone and Matthews, 2017), eleven questions probing their level of concern relative to specific issues (eg. language barrier, time difference, etc), and two open ended questions probing what the students were most excited about and most worried about relative to the upcoming virtual exchange. The post-survey, issued one-week after the exchange experience, included the same eight communication related questions and eleven questions regarding concerns, but the open-ended questions were changed to include five questions capturing their experience more broadly:

1. What goal did you have for this experience?
2. Did you achieve your goal?
3. In 1-2 sentences, what is one of the most memorable/exciting/interesting things you learned from this virtual exchange assignment?
4. What are 1-2 words you would use when asked about this international assignment?
5. What did you learn from this international assignment?

#### **4. Analysis And Results**

The open-ended questions were coded independently by each member of the research team. Each researcher read the comments and listed the most immediate one to three themes that came to mind following their reading. After all three members of the team performed their coding, the results were triangulated and any major differences discussed. As part of the open-ended questions, prior to the experience, the LAU students

expressed a general interest in meeting new people and seeing how it would be to work with people from “the other side of the world”. After the experience, the LAU students reported that the BSU students were not so different. Although, they did express surprise at how the BSU students were generally a bit older and had more work experience – this was humbling for the LAU students who for the most part live at home with their parents and haven’t worked.

*“Honestly, learning about the different side jobs my American peers have and the way they're juggling the demands of both their academic and professional work was really interesting and eye-opening.” – LAU Student*

With regards to the activity itself, the LAU students were already familiar with the SDGs, but expressed surprise at how their understanding of the SDGs expanded when talking to students from BSU.

*“I generally consider myself a solutions expert and being faced with such a deepened topic [the SDGs] made me learn how important it is to really discuss solutions before going for them entirely and to consider all factors.” – LAU Student*

Like the LAU students, the BSU students were excited for the exchange experience to gain new perspectives from the other students. In contrast, many BSU students did not have a background with the SDGs and enjoyed discussing international solutions with their LAU teammates.

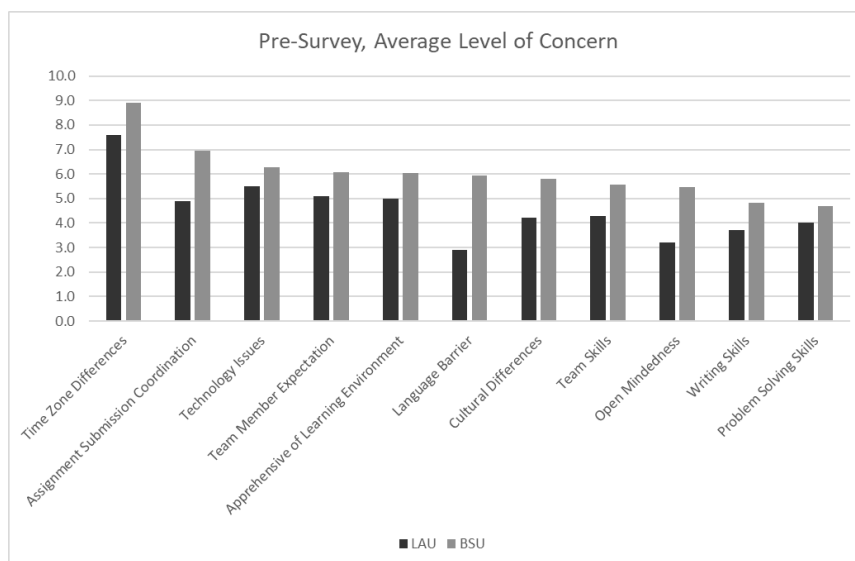
*“I learned a lot about the 2030 goals! I had no idea these existed before this assignment. After reading about them I think that more people should learn and hear about these.” – BSU Student*

Overall, like the LAU students, the BSU students noted that this was a very memorable and satisfying experience where they gained more knowledge about other cultures and saw the value in combining different perspectives when coming up with SDG solutions.

*“One of the most memorable experiences I have from this assignment is getting to hear the two international students communicating with each other and no one else being able to fully comprehend. Then afterwards, the better speaking student would explain what they had discussed and then we were able to break down the problem in a different way.”- BSU Student*

The quantitative questions within the pre-and post-survey were compared through t-tests both internally (ie paired t-tests comparing the LAU pre- to LAU post-survey results) and across entities (ie unpaired t-tests comparing LAU and BSU student).

We begin our quantitative analysis by focusing on the students’ perceptions of the eleven problems they might face highlighting the difference between the LAU and BSU students perceptions prior to the virtual exchange experience. Figure 1 shows the average rating given by each student group for each issue.



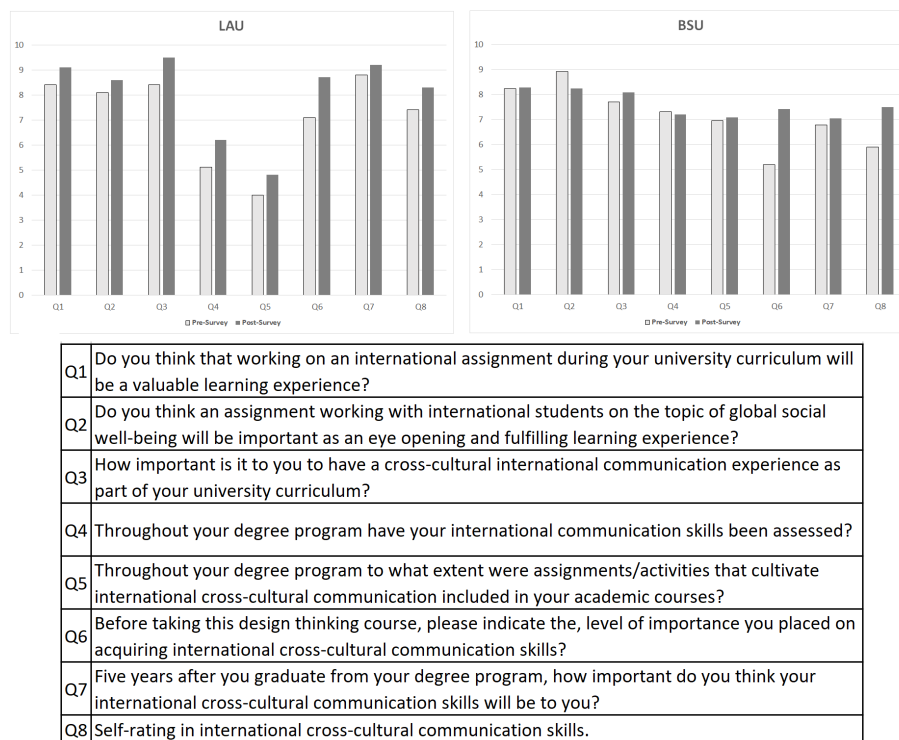
**Figure 1: Average rating of level of concern across eleven possible areas; 0 = least concerned, 10 = most concerned.**

Figure 1 indicates that the LAU students were on average less apprehensive regarding the potential issues than the BSU students. In an unpaired t-test with constant variance comparing the responses across the LAU and BSU student groups, we find that these differences were significant at the 0.05 alpha-level for Language Barrier ( $p = 0.004$ ), Time Zones ( $p = 0.01$ ), Assignment Submission Coordination ( $p = 0.026$ ), and Open Mindedness ( $p = 0.009$ ). Interestingly, the areas with the biggest difference in the average level of concern prior to the exercise were Language Barrier and Open Mindedness with the LAU students not seeing these issues as potentially problematic as their BSU counterparts.

Unfortunately, due to a technical glitch in the survey administration software at BSU, the responses to the post-survey across these 11 issues were lost. Nevertheless, a comparison within the LAU pre- and post-data relative to these 11 issues revealed that there was a decrease in the mean level of concern across all areas after the exchange, with two areas exhibiting a statistically significant decrease -- time zones ( $p = 0.027$ ) and assignment submission coordination ( $p = 0.051$ ).

Overall, as illustrated in Figure 2, the LAU students, as compared to the BSU students, expressed a higher level of agreement with the opinion questions in both the pre- and post-surveys, with the exception of the questions probing whether activities or assessments of cross-cultural communication skills were included as part of their regular university curriculum. For both of these questions, the BSU students indicated that such activities and assessments were to a certain extent included in their curriculum (approximately 7 for BSU and 5 for LAU). In terms of a significant difference between the pre- and post-surveys as measured via a paired t-test, the BSU students on average placed a higher importance on cross cultural communication after the experience ( $p = 0.000$ ); they also expressed a statistically significant improvement in their assessment of their own cross-cultural communication skills ( $p = 0.006$ ). Interestingly, there was also a significant difference among the BSU students relative to the importance of working with an international student on a global problem ( $p = 0.039$ ) -- in this case, the BSU students showed a drop in opinion in that regard. In contrast to the BSU students, the LAU students also revealed a statistically significant difference in their stated level of importance for including cross cultural communication as part of the curriculum ( $p = 0.048$ ), with more importance following the experience.

The statistically significant increase in opinion of the LAU students regarding the importance of a cross-cultural communication experience in the university curriculum is likely due to their comparatively low rating on the availability of such experiences in their university curriculum. The lack of a difference in the self-rating of cross-cultural communication skills among the LAU students may be because the class included two students from the broader MENA, outside of Lebanon, which might have affected the difference in the Pre-/Post- comparison.



**Figure 2: Comparison of LAU and BSU average responses to opinion questions noted in the legend below the graph.**

## **5. Discussion**

This case study highlights the positive value of virtual exchange relative to the UN SDGs within Design Thinking courses. All students reported a generally positive experience with a significant change in their perception of the importance of acquiring international cross-cultural communication skills. Reflecting more deeply on this result, we ask whether this result was unique to this group of students or whether we expect a similar result from all students who engage in virtual exchange relative to the SDGs. While it is impossible to know for sure, we can break down our reflection into the impact of virtual exchange and the impact of working with the UN SDGs.

With regards to virtual exchange, other courses at LAU that have been partnered with other universities achieve similar results with students reporting a great appreciation for the chance they had to communicate with students from other countries. These results consistently emerge from across all schools housed at LAU. For this reason, we believe that the positive results seen in this particular virtual exchange experience are not spurious.

With regards to the UN SDGs, the disparity in knowledge between the BSU and LAU students prior to the activity might have influenced their enthusiasm for the activity as a whole. On the other hand, the expertise that this allowed the LAU students to share may also have helped put them at ease. Having this point of “expertise” might have helped the LAU students overcome any anxiety felt by being the minority group within the activity teams.

## **6. Conclusion**

Among these results, what is most striking is the consistent increase in the recognized value of greater cross-cultural collaboration within the university experience. While the focus on SDGs was valuable as a motivator within the project and allowed for a natural inclusion of virtual exchange within the design thinking courses, the exchange experience as a whole framed the students’ overarching perception of the experience. Specifically, no matter what level of inclusion the respective university curricula have for cross-cultural experiences, at the individual level both groups of students experienced an increase in their own perception of the importance of acquiring these skills for themselves.

Both groups of students valued learning more about other people's culture and how their lifestyles are different. There were also multiple comments noting that current technology allowed for easy communication leading to meaningful collaboration. This depth of interaction led to heart felt comments such as “at the end of the day, no matter where you come from, we are all just humans as we all have something in common and we are not always so different.” Beyond recognizing their similarities, both groups of students expressed that their differences and the diversity of opinions expressed were helpful in creating something of value. These thoughts challenged the students to think outside of the box for new solutions to the SDG problems. In the end, bringing on diverse opinions and mindsets, in a collaborative manner, allowed students to break down the SDG goal into manageable parts. Thus, faculty members should seek complex, multi-faceted problems around which to frame their virtual exchange experiences. In this regard, the SDGs provide an excellent platform.

Reflecting on the differences in levels of apprehension prior to the virtual exchange experience, the LAU class was held in-person which allowed the students to receive immediate reassurance thereby lessening anxiety. Additionally, many of the LAU students have previous international experiences either from having lived in other countries or from having relatives living in other countries. Thus, faculty seeking to introduce virtual exchange activities in an online course should host at least one “synchronous” session to ready the students for the experience. Additionally, partnering faculty might consider hosting a “meet and greet” session where the students are placed into virtual breakout rooms to meet each other before starting the activity. If scheduling makes a synchronous “meet and greet” session difficult, students and faculty can also use tools such as FlipGrid to post introductory videos that can be watched prior to the start of the co-creation activity.

The experience changed the students’ perceptions of the importance of cross-cultural communication as a skill and their ability to engage in cross-cultural communication. Due to the universal change in the perceived importance of cross-cultural communication, one could conclude that whether the experience was bad or good it heightened the students' awareness of the need for these skills. This realization should serve to lower the entry barriers for faculty members who worry that they might not “get it right” when hosting a virtual exchange. It is apparent that no matter the experience, it is impactful.

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