

A QUALITATIVE ANALYSIS OF REFLECTIONS FROM A DISCUSSION OF DATA ETHICS CONDUCTED DURING A VIRTUAL EXCHANGE

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The purpose of this paper is to examine the perceptions of undergraduates who participated in a virtual exchange discussion of data ethics between the University of Florida in the United States and the University of Newcastle in the United Kingdom. In this exchange, students enrolled in a second-semester introduction to statistics course at the University of Florida completed two activities with students from the University of Newcastle. The students interacted on an online video platform, called Flip, and completed a variation of the OkCupid Data Activity. Students' reflections about their experiences were examined using a qualitative approach with the American Association of Colleges and Universities Rubrics for intercultural knowledge and competence and global learning. The analyses suggest that students demonstrated cultural self-awareness, openness, and curiosity about their peers, but did not reflect on multiple perspectives about data ethics as much as initially hoped. Instructors will need a more focused approach to engage students with multiple perspectives about data ethics. This paper connects to the socio-political aspect of statistics and data science in that the ethical use of data is affected by culture. Undergraduate students in statistics must learn about not only the ethical uses of data but also how to discuss data ethics in a global setting.

INTRODUCTION

In 2021, over 42 million people in the United States (US) worked for a US-owned or foreign-owned multinational enterprise (Bureau of Economic Analysis, 2023). This fact calls for higher education to prepare students for multi-national and multi-cultural workplaces. One way to do this is through virtual exchange experiences. Virtual exchange is when at least two instructors from different institutions, usually from different countries, work together on one or multiple activities in which students from both institutions participate. This pedagogical technique has been used in language learning classrooms for decades but has spread into other disciplines in the past 20 years (O'Dowd, 2017).

To the authors' knowledge, there are no published research studies of virtual exchange in mathematics, statistics, or data science classrooms. There are, however, a few examples of virtual exchange in other STEM disciplines. One such example was a design study in an undergraduate mechanics engineering course in which students at universities in three different countries, Venezuela, Spain, and Scotland, examined the design of car components. (Munoz-Escalona et al., 2022). Overall, the eighty-two students felt that the experience helped to expand their knowledge and to prepare them for geographically dispersed working environments. Another example from undergraduate chemistry courses in the US and Thailand had students collaborate on creating a PowerPoint presentation about a globally critical topic and analytical chemistry, such as antibiotic abuse (Watla-iad & Kradtap Hartwell, 2022). During the five-year study, students gave feedback on each other's presentations and mentioned gains in communication, confidence, and technology use.

This study addressed the research question, "How do students reflect on their experiences in the virtual exchange regarding intercultural knowledge and competence, and global learning?"

METHOD

Context

This study occurred in a large enrollment Business Statistics online course, which comprised the second semester of introductory statistics. The course first reviewed topics from the first semester and then covered topics such as one-way ANOVA, simple and linear regression, time series, non-parametric tests, and chi-square tests. The online course had one full-time instructor and three teaching assistants. The students watched pre-recorded videos online for each module. There were two modules per week and a total of 24 modules. In addition to the pre-recorded modules, students

completed an automatically graded homework assignment hosted in the online course shell in Canvas. The students also had the option to attend a live optional synchronous session twice a week in which the instructor demonstrated a few examples in the first hour. During the second hour, the students practiced a few examples independently with the instructor's help and posted the answers into a Google slide. Before the end of the class, the instructor went over these practice problems with the students. This session was also recorded for students who could not attend.

The class enrollment was typically between 600 and 900 students per semester and students had options for several virtual exchange opportunities. This course joined multiple smaller classes at multiple universities worldwide to conduct a virtual exchange. This paper, however, focuses solely on the exchange between students at the University of Florida in the United States and Newcastle University in the United Kingdom for which 24 students signed up at the beginning of the semester. Only 21 students who participated in the ethics discussion were considered for the study and only 19 of those completed the reflections. Although students in both countries participated in the introduction and the discussion of data ethics, only the US students completed the reflections. (UF: IRB202301297)

Activity

The activity included multiple parts: an introductory video, a reading about data ethics, a discussion about ethics, and finally, a reflection. The assignment progression is described in Figure 1. In the introduction, the students created a short video on Flip.com, a Microsoft-supported website. Students could post short videos and add written comments to the posted videos. For the introduction, the students were asked to select five images to discuss themselves. They then recorded themselves introducing these given images. After this, the students were required to comment on three students' videos for full credit for the assignment. This activity served as an icebreaker. Then, the focus turned to data ethics.

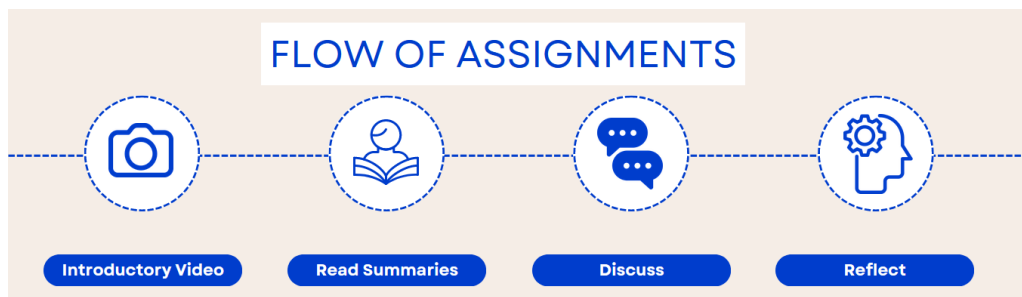


Figure 1. Progression of Assignments in Virtual Exchange

The lesson instructions for the second part were adapted from the first data ethics module described by Baumer et al. (2022) to the virtual exchange environment. The students read a summary of three articles about data use in OkCupid discussed in Baumer et al.'s (2022) ethics module 1. OkCupid is an online dating website in which participants enter demographic information and can answer up to 1000 long answer questions. The participants are then matched based on their answers. The first of the articles the participants read was by Kim and Escobedo-Land (2015) who described how they scraped data from the OKCupid website and the measures they took to protect the user's privacy, including scrambling the user information with the graphics. The next article described how a doctoral student in mathematics, Chris McKinlay, scraped data from the data set to find true love (Poulsen, 2014). In this case, the data were only available to Chris McKinlay. The third article was about data scraped by two social scientists who were interested in examining the relationship between cognitive ability, religion, political interest, and their zodiac sign (Kirkegaard & Bjerrekær, 2016). The names and cities of the OKCupid participants were removed, but the dataset was made available to everyone.

The students were then asked to answer one of four prompts. Three of the prompts were used exactly as described in the lesson by Baumer et al. (2022), but the third prompt was changed to "If you were working at OkCupid, how would you let your clients know about using their information

and how to manage if they do not agree?”. The prompts from the first activity of the article (Baumer et al., 2022) posted on the website (*OkCupid, What Should I Do Now?*, 2023) are as follows: “Discuss the use of OkCupid data by McKinlay and Kirkegaard. Was that use ethical? How did OkCupid respond? How does their work impact Prof. Kim’s situation?, What role do data anonymization and differential privacy play in Prof. Kim’s situation? Could these techniques lead to a safer product? and What is the pedagogical value of the data set? How should these benefits be weighed against the potential for harm?”

After completing these assignments, the students wrote a 500-word reflection in which they could choose to respond to two of eleven prompts that had the students reflect on their culture and the virtual exchange and how their understanding of their own culture might have changed.

Analysis

For this analysis, the AAC&U rubrics were used to determine the students’ levels of [Intercultural Knowledge and Competence](#) (Association of American Colleges and Universities, 2017) and [Global Learning](#) (Association of American Colleges and Universities, n.d.). The authors reviewed the AAC&U rubrics to determine applicability to learning outcomes. The Intercultural Knowledge and Competence rubric consists of Knowledge (Cultural self-awareness and cultural worldview frameworks), Skills (empathy and Verbal and nonverbal communication), and Attitudes (curiosity and openness) that can be rated on a 4-point scale, where 1 is the benchmark and 4 is at the capstone level. All items from this rubric except for the skill, verbal and nonverbal communication, were selected for coding. This skill is not possible to assess due to the asynchronous nature of the virtual exchange: students had scarce opportunities to improve this skill. From the Global Learning rubric, only the perspective-taking item was included because it applies to ethics in terms of determining stakeholders of ethical decisions and the inherent power structures (Tractenberg & FitzGerald, 2012). On the 1-4 scale, students who score more than 2 should be considered unusual in this study because 4, the capstone level is a goal for fourth year undergraduates. Most of the students in this course were second- and third-year students, and there had been no opportunity for them to show a level of “4” on the activities given in the course.

The data were de-identified before coding. The authors first reviewed the various indicators for each level of knowledge, skills, attitudes, and perspective-taking within the rubric carefully and then coded one randomly selected reflection together, applying and discussing each code. The unit of analysis was a sentence, with several sentences being coded together if they were identified as a semantic unit. The authors then independently coded all the remaining eighteen reflections and met to discuss their codes. In the first round of independent coding, they agreed on 76.4% of the codes, and after discussing the discrepancies, they agreed on 100% of the codes. Within each section in the results, explanations for each skill/characteristic category are provided along with excerpts from the coded reflections for the levels reported.

RESULTS

The number of text segments coded in the reflections for each skill/characteristic category and performance level in the two rubrics are provided in Table 1. The largest number of coded text segments lay at the lower performance levels of the rubrics: 1 benchmark and 2 milestones. The level of performance increases as the values increase from 1 to 4. A student at a benchmark level 1 has a minor understanding of the skills/characteristics of their own culture, whereas a student at level 4 has a full understanding of the characteristics as they reflect their own and other cultures and who to negotiate between them. Two students in the sample demonstrated more intercultural awareness. From their reflections, it can be gleaned that this was due to specific life experiences through which they had learned more about their own cultures and others. The skill and characteristic category of cultural self-awareness occurred the largest number of times across performance levels in the reflections, followed by empathy, and then openness and curiosity. The skills and characteristics that occurred the least in the reflections were cultural worldview frameworks and perspective taking. These results are explained in greater detail below.

Cultural Self Awareness

Cultural self-awareness is focused on the interplay between awareness of one’s own culture and another’s culture. At level 1, it is focused on having a “minimal awareness of own cultural rules and biases” (Association of American Colleges and Universities, 2017). In the text segments that were coded at this level, students reflected inwardly about their own culture and experiences.

Table 1. Number of text segments at each Performance Level and Skill/Characteristic Category

Skills and Characteristics	1 Benchmark	2 Milestone	3 Milestone	4 Capstone
Cultural Self Awareness	22	16	4	5
Cultural Worldview Frameworks	12	3	1	0
Empathy	21	16	0	1
Curiosity	23	0	0	0
Openness	19	12	0	0
Perspective Taking	13	6	0	0
Total	110	53	5	6

They were found to not articulate anything beyond a superficial understanding of their own culture, however. For example, students discussed their experiences of transitioning to the American school system or connecting with students who had transitioned, a desire to think about their own background, and having no experience interacting with other cultures. In terms of relating to the content of this assignment, students also commented about their lack of understanding of the terms and conditions of websites before this assignment. At level 1, one student said, “Doing the virtual exchange with students from the University of Newcastle has made me reflect on how my upbringing and culture have shaped who I am as a student”. At level 2, students can actually state and identify some of their own cultural norms, but they are still situated or favoring their own culture (Association of American Colleges and Universities, 2017). In text segments coded at this level, students were more specific about culture as they reflected on their own background, or discussed dealing with differences, or also expressed similarities with other cultures. For example, students discussed the importance of education. At level 3, students can recognize perspectives about their own culture. One example of this was a student who stated, “My family has taught me how students approach schooling in Europe and how I have to understand that different countries have different viewpoints”. In this category, only one student with 5 text segments reached performance level 4, the capstone. They could clearly articulate their own culture, “I come from a culture that emphasizes collectivism, which means I tend to prioritize group harmony and collaboration when working with international colleagues”.

Cultural Worldview Frameworks

For the first level in this category, students have a “surface understanding of the complexity of elements important to members of another culture in relation to its history, values, politics, communication styles, economy, or beliefs and practices” (Association of American Colleges and Universities, 2017). According to this description, the reflections in this category would acknowledge some understanding of these broader structures, including differences in language, time zones, daily values, values related to data ethics, and school structures. However, at level 1 these statements were very general and lacked any specifics. For example, one student said, “Being able to see how they analyzed the OkCupid data while somewhat learning their ethical codes and values was very engaging and insightful”. At level two, students demonstrate understanding of the

complexity of various elements of another culture. For example, in a text segment coded at this level, they stated that the students in the UK had differing opinions about data privacy. At level three students articulate structures within the systems more clearly. The one reflection at this level stated that there was “unanimous agreement on what measures should be taken to protect privacy online and the limits we should establish when we authorize online spaces to collect our personal information.”

Empathy

As the second most common category, empathy at level 1 is when the student can “view the experience of others but does so through own cultural worldview” (Association of American Colleges and Universities, 2017). At level 1, the most common passages in the reflections were about the similarity of experiences between students in the UK and in the US. Students stated that their peers tended to have a shared focus on family and pets and that even “students’ rooms look very similar.” They shared commonalities such as love of a city or of shared responses to the data ethics questions. A common statement was that they didn’t see many differences, for example one student said “In my video’s responses, the UK students were in agreement with my statements. Although I wasn’t expecting them to have much of a difference in opinion, it was nice to have my ideas and opinions supported and validated.” At level two, the reflection “identifies components of other cultural perspectives but responses in all situations with own worldview” (Association of American Colleges and Universities, 2017). In the coded excerpts, students reflected that the students in the UK had a similar way of life and the same language. Two comments acknowledged that the US students brought up additional issues. One student said, “they also brought additional thoughts that went deeper”. One student also showed empathy at the capstone performance level of 4, which is the ability “to act in a supportive manner that recognizes the feelings of another cultural group” (Association of American Colleges and Universities, 2017). One student reflecting on their leadership role in an international experience said “Although some other teams just picked their best man and made him participate in most of the individual activities, for us, it was a team effort. This was critical because not only did we become great friends through this experience, but everyone was able to shine at what they were good at, making us the talk of the town. As the leader, I also learned so much from different perspectives or ideas, helping me grow as a more well-rounded person.”

Curiosity

Level 1 in the curiosity category was the largest code in the reflections, which “states minimal interest in learning more about other cultures” (Association of American Colleges and Universities, 2017). Students voiced an interest in connecting with people in Newcastle, a renewed urge to travel, an interest in experiencing the culture, and a question about the cultural impacts of data ethics. Others talked about their upcoming study abroad experiences and longing to travel to Europe or the UK. They commented on how they enjoyed meeting the University of Newcastle students, speaking of “gaining insight” and “connecting” to the students. Additional comments reflected wanting to learn about their beliefs, values, their culture. Others had contemplations about connecting culture with data ethics. However, these statements were only minor acknowledgments of characteristics. For example, one student said, “I greatly enjoyed having the ability to gain insight into the lives of my international classmates through their sharing of stories and personal memories.” The students did not ask simple or deeper questions (levels 2 and 3) about other cultures.

Openness

Openness focuses explicitly on the willingness to interact with others. At level 1 of the openness category, students stressed their desire to communicate with students from the UK. They wanted “to interact with students from a different culture” and “share our views.” A student at this level stated, “I believe that the world is so diverse and has so much to offer that it would be sad to only immerse myself in the American culture which I have known all my life.” Students’ reflections at level 2 discussed more specific desires for interactions, including discussing their family histories

and learning about commonalities. One even voiced a desire that if they were to re-do the assignment, they might join a group that was more different from their own culture.

Perspective Taking

For the first level of the perspective-taking category, students identify “multiple perspectives while maintaining a value preference for own positioning” (Association of American Colleges and Universities, n.d.). At this level, students discussed how they viewed different perspectives or behaviors in general. However, a few students did discuss the differences they saw regarding data ethics. Three students discussed differing perspectives on data privacy, mentioning that the UK had stricter requirements for privacy. A statement that exemplifies this is, “The UK students had perspectives that were much stronger and against the idea of sharing user information without consent”. Level two states that students should identify and explain their perspectives. In this study, students at level 2 continued to talk about perspectives and behaviors. Nevertheless, one gave more explicit evidence to further the data ethics discussion that “the UK is more likely to stand up for their rights and not comply with rules that invade privacy because of the notion that ‘that’s just how it is”.

DISCUSSION

The results of this study indicate that students’ reflections on the virtual exchange experience demonstrated curiosity, cultural self-awareness, empathy and openness, but largely remained at level 1 of these categories. They also did not adequately reflect on multiple perspectives about data ethics, with only 13 comments at the benchmark and 6 at the next level. Understanding multiple perspectives was also noted as a benefit by US students in a US-Thailand exchange in an analytical chemistry course where students completed team projects and peer-reviewed each other’s work (Watla-iad & Kradtap Hartwell, 2022). Although learners discussed perspective-taking in this virtual exchange, it was not at the level hoped for with the activity. They also demonstrated low awareness of cultural worldview frameworks. Anderson et al. (2016) suggest that instructors must implement intentional activities for students to grow in intercultural competence. If having students identify multiple perspectives of data ethics is the goal, students must be required to demonstrate identifying different perspectives in the activity. There are possible options for improving this activity. One of these options is for students to think of data privacy as a continuum from completely open to completely closed and to place examples of data availability that fall at different points. Another option would be for students to create a table of stakeholders and list the risks and benefits for each. In addition, students can be asked to examine different data ethics from national societies, such as the American Statistical Association. The students from different countries could then examine how the risks and benefits would change from country to country. Connecting the concepts of culture to data ethics is essential in teaching students how to navigate ethical decisions about data. Identifying and discussing data privacy for one culture will not allow students to negotiate, discuss, and advocate for change in cross-country organizations. This is similar to Bennett’s Developmental Model of Intercultural Sensitivity (1986), in which individuals can range from denial of differences to adaptation. At the adaptation level, students can negotiate between cultures without losing their ethical principles, but they should also acknowledge the principles of others who are different from themselves.

LIMITATIONS

Since the reflections were graded, it is possible that some students wanted to profess their growth in a topic even if they did not feel that they had grown based on the activity. Given the lesson's focus, the amount of discussion about data ethics in the reflection was disappointing. The authors expected more discussion about this topic. In the future, asking specific questions about how students' views of data ethics have changed will be critical.

CONCLUSION

This study explored virtual exchange as a cost-effective method for business students to engage with students from other cultures regarding data ethics. Virtual exchanges are valuable for students to experience different perspectives. Still, they must be structured and scaffolded purposefully for students to reach higher Intercultural Knowledge and Competence and Global

Learning levels. Identifying differences is the first step for students to be able to negotiate conversations about data ethics across cultures later.

I want to thank Dr. Lee Fawcett at Newcastle University in the United Kingdom for helping me with this exchange.

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