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ACROSS THE ATLANTIC:

Service-Learning in Spain and Morocco

Lauren Ward (*Biological Sciences*)

STUDENT AUTHOR BIO SKETCH

Lauren Ward is a 2018 graduate of Purdue University where she majored in biology. While at Purdue, she studied abroad twice and earned certificates in Learning beyond the Classroom and Peace Corps Preparation. She currently attends Tulane University where she is pursuing a master of public health and tropical medicine degree and is a graduate research assistant in a soil and aquatic microbiology laboratory. Lauren has continued her intercultural learning with Tulane's Global Scholars Program and plans to travel to Suriname this year to expand her knowledge of environmental health challenges. She hopes to eventually earn a PhD in epidemiology or disease ecology in order to pursue a career in international health research. In this article, she details her first experience traveling abroad to Spain and Morocco with a Purdue service-learning course.

INTRODUCTION

Studying abroad was one of the most rewarding experiences I had as an undergraduate at Purdue University. As cliché as it may be to say, my study abroad experiences were life changing, not only because they were the first times I traveled beyond the United States, but also because they provided me with a foundation for intercultural learning that I continued through undergrad, into grad school, and hopefully into my future career. As connected and globalized as today's world is, still only 42% of U.S. citizens hold a passport (United States Department of State, 2017). I came to Purdue from a rural area of Indiana, never having met many people who were not from the United States, and only knowing a handful of people who had ever traveled abroad. Over my four years at Purdue, I made friendships that spanned religions, languages, borders, and continents. During my junior year, I was living with a group of friends, about half of whom were international students. I had not considered study abroad before, always saying I was simply too busy. My roommates encouraged me to apply to study abroad, even if only for a short time. I began

looking into programs and found that I could easily fit one of Purdue's spring break offerings into my schedule. I chose a program geared toward science students that would allow me to spend half of the semester expanding my cultural knowledge in the classroom, and travel to two countries over spring break of my junior year.

Science, Invention, and Culture in Spain and Morocco (SCI 19500) is a Purdue service-learning study abroad offering. Purdue students develop a science presentation and activity for Moroccan high school students, allowing for cultural exchange and for the high school students to learn more about university life and science majors. The course has traditionally been offered during spring semester, though has recently undergone some changes to the length of the program. I traveled abroad over spring break 2017—in 2018 the travel portion became a Maymester trip, allowing participants to spend a little longer exploring each site. The course was an excellent choice for a first study abroad, as students spend a semester before travel in a Purdue classroom building cultural competence and learning about the history of scientific developments in the Islamic Golden Age. This

classroom learning provided important context and a framework for deeper understanding of the experiences students will have while in Spain and Morocco.

Before this course, I had little background in history and had never traveled outside the United States. I became interested in study abroad late in my undergraduate career, toward the end of fall semester junior year, and thus was interested in participating in a short-term study abroad. I had no previous experience with service-learning, but was attracted to the idea of a trip that involved more than just taking classes and touring a new place. The first portion of our course focused on various aspects of cultural competence and the history of scientific developments in the Islamic Golden Age in Spain and Morocco. Special emphasis was placed on the shared history and interconnectedness of the two countries, which, though they lie on separate continents, are separated by only nine miles of ocean, the Strait of Gibraltar. Emphasis was additionally placed on the connections between the discoveries of historic Islamic scientists and the science and research that we participated in every day at Purdue.

The service-learning aspect of this course was designed to draw our attention to the cultural connections to science, understand the different ways in which science may be taught, and increase our awareness of the contributions of the Islamic Golden Age to modern-day scientific advances. We were tasked with developing individual projects that would be presented at a high school in Tangier, Morocco. The projects were to present a scientific development of the Islamic Golden Age, the contributions of that development to Purdue science, and a hands-on activity to engage students. Overall, the projects were intended to introduce the Moroccan students to university life and scientific fields of study. We also planned a few cultural awareness activities that allowed both Moroccan and American students to practice cross-cultural skills, something that is invaluable for all of our future travels and studies abroad.

Our time abroad began in Madrid, Spain. From the airport, we immediately traveled to the medieval walled city of Toledo. Our day in Toledo was spent learning about the multicultural history of the city, with Christian, Muslim, and Jewish influences; sampling famous foods of the region, including Iberian ham, marzipan, and olive oil; and visiting a sword factory, where swords are still made in the traditional way, by hammering hot metal into the desired shape by hand. From Toledo, we then traveled on south to Córdoba. In Córdoba, we visited the Mezquita—a UNESCO World Heritage site that was



Figure 1. Ornate pillars at the Mezquita Cathedral in Córdoba, Spain.

once a mosque during the time of the Moors in Spain, but now is a cathedral built into the original mosque (see Figure 1). The night in Córdoba was spent exploring the historical sights of the city, admiring orange trees, and sampling Spanish dishes of paella (rice with meat and vegetables) and aubergine (eggplant).

On the next morning, we continued farther south toward the Mediterranean Sea. We passed through seemingly endless kilometers of olive tree groves on the sides of hills. Then as we came over a ridge on a winding mountain road with the Beach Boys playing over the bus speakers (our driver had elected to play American music for us), we were able to see the ocean—and not far off, more mountains, our first glimpse of Africa. In the coastal town of Tarifa, Spain, we boarded a ferry and left Europe for Morocco.

DESCRIPTION

Our class partnered with the American School of Tangier (AST) in Tangier, Morocco, our first stop upon entering the country. The mission of the school is “to equip [their] students with the tools and knowledge to become

successful, global citizens in a creative, community environment” (American School of Tangier, 2017). The school serves students from prekindergarten through grade 12. The students come from various cultural backgrounds—a mix of Moroccan and American students, as well as students from other nationalities. For the purposes of our partnership, we planned to share our projects with the high school students who were preparing to apply to college in the near future. The project opportunity was generated by our professors and the head of the school. AST has occasional visitors and guests that put on activities or special topic workshops for students. These activities allow AST students to learn skills that supplement their classroom education and allow for interaction with college students as they prepare for their next steps after high school. More information for interested groups or students is available on their website: <http://www.theamericanschooloftangier.com>.

Months earlier, while still at Purdue, we had been divided into several groups that each chose a topic, ranging from scientific history to aerodynamics, to my group’s topic, mathematics and timekeeping. We had been tasked with choosing a topic that bridged a scientific development of the Islamic Golden Age with current research at Purdue and developing a presentation and corresponding activity for the high school students at AST. To add an interdisciplinary challenge to the project, we were assigned to groups with students from different majors and asked to all integrate the different backgrounds we brought to the table into our project. Our group researched scientific innovations of Moroccan scholars and found that clocks were one of the developments that came out of the Islamic Golden Age. Furthermore, the Dar al-Magana (Arabic for “clockhouse”), a famous water clock constructed in the 1300s, is located in Fez, Morocco, one of the scheduled stops during our trip. We all considered the importance of being able to keep time to scientific experiments: a group member with an interest in geology considered the importance of dating rocks and artifacts, while another fellow biology major and I considered the need to time the length of incubation for microbial cultures, and an engineering student considered the need to design and assemble a clock so it could keep time accurately. Without the innovation of historical Moroccan scholars, even one of the most well-known symbols of Purdue University, the bell tower, would have not been possible!

Upon arriving at AST in Tangier, we first toured the Makerspace, a room dedicated to engineering and scientific innovation and creativity. We were shown many of the projects that middle and high schoolers had been

working on, ranging from deconstructing a printer in order to understand how the parts worked to creating a low-cost and high-durability prosthetic hand from plastic materials. We then continued to the library, where the high school students had assembled to hear our presentations. My teammates and I presented a brief overview of the history of mathematical developments by Moroccan scholars leading up to the invention of some of the first devices for keeping time. We then discussed the uses and necessities of timekeeping devices. Today, instead of a complex water clock, we have a digital display of the time on our cell phones. The technology has changed drastically over centuries, but the purpose is the same.

When we completed our presentation, we presented the students with a challenge: a sheet with 12 algebra problems to be solved. The equations ranged in complexity, but a further challenge was posed: all of the solutions were related, and the answer to the relationship had been covered in our presentation. The first person to solve all 12 problems and determine the relationship would earn a prize our group had chosen before leaving Purdue. Within 40 seconds, the math teacher had solved the problems, and just a few seconds later, several students had also finished them, but the riddle was yet to be deciphered. The teacher and one student worked together for a few seconds before realizing the answers were the numbers 1 through 12—each hour on a clock face. Our prize was a clock with those same equations in place of the digits for the hours. The math teacher and students decided the clock would hang in the Makerspace as a reminder of the connections between Purdue and the high school and between historical Moroccan science and the modern and future research developments the Purdue and Tangier students could one day contribute to.

COMMUNITY IMPACT

After completing our presentations, we had time to spend talking to the high school students and completing intercultural exercises. One activity involved an envelope of random objects: a cotton swab, a button, a rubber band, a feather, etc. We broke into pairs of one Moroccan student and one Purdue student, and one person was told to sort the objects in a way that made sense to them, then the other student would try to determine how the objects had been sorted. On my turn, I arranged the objects alphabetically—this seemed to be the simplest way to me. After my partner looked at them for a while, Dr. Yngve came to observe, and asked how I had sorted them. I explained, and then she asked my partner to sort them alphabetically as well. She reordered several of them, to my confusion—then she

explained “Alphabetical, but now in French.” She again rearranged some and then said “Now still alphabetical, but in Arabic.” I rearranged the items a fourth time—still alphabetical, but in German. This exercise had seemed to be simple, but held a much bigger lesson about cultural worldview and interpretation of situations. We stayed at the school until the afternoon, speaking to students about applying to college, comparing the differences we observed already between Morocco and the United States, and getting involved in games of soccer and basketball.

While the results of our project may not have been tangible, making the evaluation of our project’s success subjective, it was clear that the Moroccan students and the Purdue students enjoyed interacting with each other, sharing stories, and working together to complete activities. The AST students enthusiastically listened to and participated in our presentations and asked questions. The library where we held the presentations was filled with conversation and laughter all afternoon as we all sat together and talked about everything from different foods to what it was like to attend university in the United States. I feel that the projects were successful, as they sparked conversations both about science and culture.

STUDENT IMPACT

After our time and service-learning project in Tangier, we continued to travel through Morocco. We took an evening train to Fez, a colorful and historical maze of a

city, where we stayed for several days with host families and were allowed to explore the city and *souq* (market). There, we highlighted the ways in which science is a part of daily life. We visited the tannery, where animal hides are still tanned and dyed by hand for leather products. We saw tradespeople soak the hides in vats of colorful dye solutions, which we learned were made from local plants—mint for green, saffron for yellow, poppies for red, and henna for orange (see Figure 2). We communicated with our host families in a mix of French, Arabic, English, and hand signals, and experienced Moroccan hospitality, as our host families took us in and cooked traditional Moroccan meals for us and shared mint tea (see Figure 3). Overcoming the language barrier was perhaps the biggest challenge of the trip for me. Speaking no French and no Arabic and staying with a host family who spoke no English challenged me to communicate creatively in order to convey to the host family that we appreciated their hospitality.

On one night, we were able to share dinner with Suzanna Clarke, the author of *A House in Fez*, the book we had read for our pre-travel course at Purdue. Before dinner, we spent some time wandering the streets with David, an architect who worked with Ms. Clarke to restore a traditional Moroccan home, observing the architectural styles and patterns of *zellij* (tile) that adorned the floors and walls of homes that we passed (see Figure 4). At dinner, we were able to discuss with Ms. Clarke the differences we had observed between Morocco and Spain, and she shared her observations of



Figure 2. Vats of colored dye at the tannery in Fez, Morocco.



Figure 3. Pastilla (a savory pastry with chicken) and Moroccan mint tea.

many of those differences as well, as she had first come to Fez from Australia.

On our last day in Fez, we separated into two smaller groups to engage in cultural activities in different parts of the city. One group headed to a craftsman's workshop in the city where they spent the day learning about Moroccan tiles and creating their own designs. The group I joined went to a home where we learned about traditional Moroccan cooking. We spent the morning kneading dough and preparing chicken, before walking down the street to the community bakery where residents pay a small fee to have their prepared items baked in the bakery ovens. While our bread was baking, we returned to the home and prepared the rest of our meal: roasting green peppers over a fire, peeling roasted tomatoes, and sampling preserved lemon. We returned to the bakery to pick up our finished items as schools were releasing students to return to their homes for lunch. Schoolchildren skipped past us, giggling at the strangers in pink aprons carrying trays with warm loaves of bread and roasted chicken.

After leaving Fez, we went to Azrou, where we had lunch at an artists' cooperative. I particularly remember



Figure 4. The author in Fez, Morocco standing against a wall decorated with zellij.

the energy of the people that day—it was a Friday, the Muslim holy day, and the man who greeted us before lunch wished us well as he was off to the mosque for Friday prayers. After lunch, we met with women who were able to sell their weaving through the cooperative, and were able to watch as one of them worked weaving red-dyed wool into what would, in several weeks, become an intricately patterned rug. We then toured several of the artist's stalls, seeing crafts ranging from weaving to pottery, to woodworking, to mounted collections of local rocks. We continued a little further into town, where we met a group of women who ran a distillery where they used herbs, flower petals, and local ingredients to make scented oils and soaps. We were served mint tea as they

showed us their setup, a series of copper pots—one filled with boiling water, one with the ingredients for the oils, one with a spout—and a jar to collect the oil. They spoke to us about the chemistry of the process as they made rose oil.

After Azrou, we headed for our last stop in Morocco. We arrived in Casablanca on a rainy night and went to dinner at the aptly named Rick's Café, where we celebrated two of our classmates' birthdays and reflected on our fast-paced week in Morocco. In the morning, we began our journey back to Purdue.

Prior to this study abroad, I had no experience with international travel. However, the time in Morocco and the intercultural competence curriculum before departing sparked my interest in continued intercultural learning and partnership. I believe this trip had a lasting impact, resulting in my decision to study abroad a second time, and eventually to pursue a graduate degree from a university with a strong focus on global health. The lessons I learned from being immersed in a completely new culture even for just a week have influenced my worldview and provided a foundation for further cultural immersion and understanding.

CONCLUSION

Service-learning is defined by Purdue University as “a method of teaching and learning that enriches academic experiences and life-long learning by engaging students in meaningful hands-on service in the community” (Purdue University Libraries, 2018). The concept provides a unique lens through which to view study abroad, providing more interaction and hands-on “doing something” while still seeing the sights and taking in the culture and surroundings. I believe the service-learning aspect of the

Science, Invention, and Culture in Spain and Morocco course increased student involvement and enhanced the depth of the knowledge gained from the course.

While we were able to give the students in Morocco a day of science and cultural activities, the impact of the visit lasted far beyond that day. Interacting with the students in Morocco expanded my perspective on education across the world and encouraged me to take advantage of further study abroad, travel, and cultural activities throughout my undergraduate and graduate career. I hope that this article may inspire a student who may be unsure about studying abroad to consider a service-learning experience.

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