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To Study Abroad or Not to Study Abroad: That Is the STEM Question

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☰ TO STUDY ABROAD OR NOT TO STUDY ABROAD: THAT IS THE STEM QUESTION

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ABSTRACT

As more science, technology, engineering and math (STEM) students consider studying abroad, it is critical for researchers and student affairs educators to know more about how students engage with the study abroad process and make decisions about whether to participate or not. This qualitative study examined the decision-making process in which STEM students engaged regarding study abroad at a STEM liberal arts college. An organizational culture lens was utilized to make meaning of the formal study abroad decision-making process within a deeply-entrenched institutional bubble that permeates all college facets and stakeholders. Focus groups engaged both participants who studied abroad and those who ultimately chose not to, yielding five overarching themes: decision-making process, motivations to study abroad, college bubble, rigor, and academic issues. This study provides critical insight into understanding STEM study abroad decision-making in a unique institutional culture. Moreover, it offers student affairs educators meaningful knowledge to help support STEM students navigating the study abroad process and sheds light on the ways in which deeply-entrenched institutional cultures can impact decision-making processes. Keywords: liberal arts colleges, organizational culture, STEM, study abroad

Historically, undergraduate students in science, technology, engineering, and mathematics (STEM) majors have not partaken in study abroad (SA) programs to the same degree as students in social science, business, and humanities fields (Klahr, 1998). Recent evidence demonstrates that STEM

students in some fields have slowly garnered a larger portion of the SA pie among majors. Table 1 (below) shows a steady, notable rise in physical/life science

Table 1. *Percentage of the Total Study Abroad Population by Respective STEM Field, National and Welsh College (selected years)*

	Physical/Life Sciences	Engineering	Mathematics/Computer Science
1996-1997	6.8%	1.9%	1.6%
2006-2007	7.3%	3.1%	1.5%
2009-2010	7.5%	3.9%	1.5%
2010-2011	7.9%	3.5%	1.8%
2011-2012	8.6%	3.9%	1.7%
2012-2013	8.8%	4.1%	1.9%
2013-2014	8.0%	4.6%	2.1%

Source: Open Doors, 2008, 2012, & 2013.

students' participation in SA, and double the number of engineering students between 1996-1997 and 2011-2012. While these percentages are small, the data shows an overall trend toward more STEM students making the decision to study abroad.

Salisbury, Umbach, Paulsen and Pascarella (2009) argued STEM students are no less interested than other students in studying abroad. They asserted that curricular issues impeding SA opportunities should be examined. However, Phillips (2014) contrasted this by implying that recruitment efforts of STEM students does not seem to be making a large difference in their decision-making process. While the literature on SA for STEM students is minimal, available data suggests that STEM students study abroad at lower levels (Shirley, 2006; Stroud, 2015) in part because of how structured some STEM academic programs are within their specific curricula (Loberg, 2012). For example, Stroud (2010) found in a study on intent to study abroad that there was a significant difference in the SA participation rates between students in social sciences and those in engineering. Interestingly, though, there was no significant difference between those in social sciences and those in biological and physical sciences. Additionally, Stroud (2015) found that while the number of STEM majors studying abroad doubled across the U.S. between 2000-2001 and 2012-2013, the number of STEM majors tripled during this time

period, and as such, the number of SA participants within STEM majors was proportionally decreased. In summary, STEM SA is under-studied in general, and there is a considerable lack of knowledge regarding students' decision-making processes and how institutional cultures support or recruit STEM majors to study abroad.

PURPOSE

This study occurred at a STEM liberal arts college (referred to as Welsh College) where SA is greatly impacted by the institutional culture. Since there is only a small amount of literature on STEM SA students, this study offers a window into the SA student decision-making process as a byproduct of Welsh's unique institutional culture. As a STEM liberal arts college with very high-achieving students, Welsh College is known for its deeply-entrenched sense of institutional culture. Students often refer to the *Welsh bubble*, a safe-haven to explore academic and social interests. Within this safe haven, students and other stakeholders have developed an entrenched culture about academic and social pursuits that have implications for the academic decisions students make in the Welsh College context. The purpose of this study was to explore how students at Welsh make SA decisions within the institutional context and culture of this bubble. We wanted to know how students who engaged in the formal institutional process (both those who chose to SA and those who ultimately elected not to) of investigating SA ultimately made their decision within the institutional context. Therefore, the research question guiding this study is: how does the institutional bubble impact the decision-making process of students formally considering study abroad opportunities at a STEM liberal arts college?

THEORETICAL FRAMEWORK

Toma (2005) argued that higher education institutions are always working on strengthening the culture of their organization and that culture matters, while Niemann (2010) posited that it is multifaceted (and we would add, quite nuanced). This could not be more aptly illustrative of Welsh College, where the organizational culture is embedded deeply across and among institutional stakeholders. Since the Welsh bubble can constrain students' academic and social decisions, this study explores students' SA decision-making through an organizational culture lens. This lens becomes quite meaningful for examining the guiding research question because it helps make meaning of shared understandings including symbolic beliefs and notions (Heracleous, 2001). This study utilized a non-traditional organizational culture framework because this type of perspective views individuals as affected by various influences and constraints while also receiving information from multiple constituencies

emanating from various directions (Love, 1990). In this case, students received information regarding SA from a variety of institutional constituencies within the bubble including but not limited to professors, advisors, peers, student affairs educators, institutional history, and other factors.

This study specifically employed Love's (1990) conceptualization of organizational symbolism because of the shared values and assumptions proffered by the Welsh bubble. Love (1990) noted that within mini-societies, such as Welsh College, there are common ways of constructing and construing meaning about academic and social contexts. Furthermore, Toma (2005) and Niemann (2010) indicated that different components of organizational culture, including symbols, foster understanding and shared values. As a result, this can influence decisionmaking within the organizational context. We argue that these may include language and distinct, idealized badges of honor, in figurative and literal senses, or even edifices and photographs that become mythologized to some degree, as Metcalfe (2012) pointed out. In this study, that decision-making relates to deciding whether or not to study abroad. Tying this back to Love's (1990) framework, it provides a meaningful lens to explore SA decision-making for this study because "[t]he focus of this form of organizational analysis is on how individuals interpret and understand their experience and how these interpretations and understandings relate to action" (Smircich, 1983, p. 351). Geertz (1973) interpreted culture through the lens of organizational symbolism as a "framework of beliefs, and values in terms of which individuals define their world, express their feelings and make judgments" (p. 144-145). This lens adapts well to this institution, because students at Welsh College often define their experience through the institutional bubble. Their interpretations and self-reflections regarding SA are informed through their engagement within the bubble which leads to action in the form of a decision. Finally, the use of this framework can be further substantiated because we worked at the institution and therefore have a deep understanding of the college's culture.

METHODOLOGY

SELECTION OF FOCUS GROUP PARTICIPANTS

Office of Institutional Research (OIR) collaborated with the Office of Study Abroad (OSA) to identify currently enrolled students who either participated in a Study Abroad program (SA), or formally considered studying abroad but chose not to (No-SA). Criteria for SA study participants included: a) independently contacting OSA to express interest, b) attending SA information sessions and workshops, c) selecting a specific program and completing its required paperwork and application, d) gaining institutional approval for SA, and e) participating in a program. No-SA student criteria included: a) contacting OSA to express SA program interests, b) attending information sessions and workshops,

and c) ultimately deciding not to SA. OSA sent qualifying students emails, inviting their participation in the study. Those interested in participating were asked to directly contact OIR. Separate focus groups were held for SA (3) and non-SA students (2). The study yielded 22 SA and six nonSA students. All No-SA students who participated in the focus groups were female; of the students who studied abroad and participated in the study, 11 were male and 11 were female.

Three international students were part of the 22 who studied abroad.

FOCUS GROUP PROTOCOLS AND TOPICS

A set of protocols ensured consistency across focus groups. Before discussions started, participants signed informed consent forms. They were then asked to complete a brief questionnaire containing four Likert scale items for SA students and two for No-SA. This was followed by two open-ended questions for all participants. Each session was moderated by the researchers. The lead moderator facilitated the discussion while the co-moderator served as note-taker and co-facilitator. Focus groups commenced with a brief discussion of the purpose and reminders of the conversation's confidential nature. Discussions were guided by seven questions for SA students and five No-SA students (with the two opening questions being the same for each).

DATA ANALYSIS

The research that applied the framework analysis used for this study was developed in the United Kingdom in the 1980s by the National Centre for Social Research. This method is often used to analyze and code qualitative data gathered in focus groups (QSR International, 2012). Ritchie and Spencer (2002) noted that while framework analysis requires the implementation of five highly interconnected steps, it also "relies on the creative and conceptual ability of the analyst to determine meaning, salience, and connections" (p. 310). As Witenstein (2015) noted, the five steps – familiarization, identifying a thematic framework, indexing, charting, and mapping and interpretation – are iterative, offering opportunities to return to previous steps while also being highly systematic.

RESULTS

Five overarching themes emerged: decision-making process, motivations to study abroad, college bubble, rigor, and, academic issues. For the purposes of this portion of the study, data supporting these themes from nine of the focus group questions are shared. **What intrigued or piqued your interest**

the most about the SA program as a potential component of your college education?

One driving force was the opportunity to take classes at different universities not offered at Welsh. Two additional factors that were mentioned included students wanting to immerse themselves in cultural exchange and to take a break from Welsh's academic rigor. For example, Hugh (personal communication, January 30, 2013) acknowledged the College's strategic goal of understanding the impact one's studies and research can have on society by stating, "the global society aspect [of study abroad] added a component to my education by [enabling me to] look at the cultural exchange and understand how people in different countries live, act and operate." Expanding on this, Sue revealed life at Welsh can be isolating:

Being in the [college] bubble makes it hard to know what is going on in the world. They say that we should know what is going on in the world, but I am not sure that this mission is really engaged at the school (personal communication, January 30, 2013).

No-SA students were concerned the education abroad would not be of similar quality or that it might not align with their academic interests. Roberta (personal communication, January 28, 2013) exemplified this by sharing "The way study abroad is portrayed at [Welsh] was made to sound like a nice 'vacation' for upperclassmen. I thought, 'why take a break from this college if I am paying all this money?'"

What key factors and individuals helped you to make your final decision to SA? How did the OSA process help you make your final decision?

While the student participants described the skepticism with which the idea of SA is met at Welsh, they also praised the college's director of the Office of Study Abroad. This full-time staff member oversees the SA office and works with all Welsh College students who express an interest in SA opportunities. Many student participants – both SA and No-SA – praised the Director's enthusiasm and support that guided them toward an affirmative decision. Mentioned almost as frequently in this vein were Welsh faculty, yet when it came to academic department support, there was more of a mix in support levels.

In contrast, students frequently mentioned that their peers were generally unsupportive about leaving campus for a semester. "While my professor thought it was a good idea, my friends thought it was a bad idea," reported Eugene (personal communication, January 28, 2013). Beth (personal communication, January 20, 2013) added, "there is a general sentiment that students [at Welsh] who do not study abroad just like being here a lot." Furthermore, SA students shared peers' discouragement

because they believed it would be difficult to catch up on one's studies upon returning. In response, SA participants imparted that careful academic planning before and after SA was essential to ensuring on-time credit completion.

It is interesting to note that some participants identified SA as a pathway to completing coursework, particularly for those students who intentionally studied a modern language. For instance, a student who took French her first year was inspired to study in France while another revealed one of her academic majors was Spanish and chose to study in Spain to improve fluency.

What did you hope to gain from taking part in SA? What did you anticipate would be the most important contribution of SA to your college education? The challenge of learning in and navigating a foreign education system was intriguing to many SA students. Whitney (personal communication, January 29, 2013) said, "I felt completely on my own in part because the university was so large. It made me appreciate being at a small college." Jerry (personal communication, January 28, 2013) revealed he purposefully wanted to explore the United Kingdom's education system. "It was a really cool experience to have that different learning style," he said. "There was more in-depth learning, so while I learned fewer things in the broad sense, what I learned was more in-depth and focused." As students discussed opportunities to take a break from Welsh, Hugh (personal communication, January 30, 2013) admitted, "I am a stressed-out guy, and wanted to leave America for a more laid-back environment ... a place to let go and to reflect on life. That was so valuable." Other students noted their SA experience offered opportunities to explore non-STEM interests. For example, one student enrolled only in Humanities class while an international Welsh student studied music exclusively. Similarly, several credited STEM-related courses not available at their home college as an advantage. When considering growth opportunities and independence, Lisa shared:

Being in new situations is challenging for me, and I thought [SA] would be a great step to get over that. Here at home, I am not responsible for mundane tasks, like taking out the trash, but in Berlin, I had to do everything on my own (personal communication, January 29, 2013).

How do you see the study abroad experience enhancing your educational experiences versus those students in STEM programs who do not have this experience?

SA students credited the experience with personal growth across many areas. For example, Ellen (personal communication, January 29, 2013) "...found my time away from my college helpful as it enabled me to reflect on what I am doing in college and why." Further supporting this idea, the following two statements exemplified students' revelations about this opportunity helping reevaluate priorities and goals:

We all take the same courses and get the same education at this college. Being in this same environment is not necessarily that healthy. When you are away, you realize that you learn that there is more to life than doing problem sets and all of the stress that comes with our college education (Eugene, personal communication, January 29, 2013).

Knowing the impact of what it's like abroad and how it impacts your life [is essential]. I was more relaxed when I returned to college, and the rate at which I live my life now is much slower than it is for other students here (Carl, personal communication, January 30, 2013).

Several students remarked that college students remaining isolated on their campus are truly missing out on opportunities to experience the world from new perspectives. For instance, Carl shared:

I saw people who are happy with what they have in Europe. Seeing how others lead their lives abroad makes you understand a bit better how to lead your own life. Students [at this college] don't have that opportunity if they don't study abroad (personal communication, January 30, 2013).

Experiences abroad, whether in or outside the classroom helped students "learn how to survive in another environment" (Stephanie, personal communication, January 28, 2013). In sum, studying abroad enhanced students' growth academically and socially which essentially supported their career and personal growth.

How could your SA experience help influence other STEM students – at this college or in other STEM programs – to consider studying abroad?

All SA students noted that they talked about their experiences quite frequently upon their return, yet their peers often grew tired of listening. Overwhelmingly, participants were passionate that SA programs would provide more benefit than detriment to Welsh peers. One of the most valuable lessons they learned from their experiences was that time, effort and motivation made it possible to study abroad and complete their Welsh education in a timely fashion. As noted earlier, students indicated that some academic departments at Welsh were more supportive of SA than others. "I keep hearing students say, 'I can't study abroad because I'm in [a particular major]', but it's totally doable if you prepare a bit more" (Lisa, personal communication, January 29, 2013).

SA students frequently discussed the institutionally pervasive notion that an education elsewhere would not contain the quality or rigor at Welsh. Since students take pride in saying their class schedules are more difficult or rigorous than others, "that mentality makes it hard for students to understand...they can do SA" (Whitney, personal communication January 29, 2013) Whitney continued,

“you just have to tell students here about SA earlier and hook them into it early in their college education.” Ultimately, Scott (personal communication, January 30, 2013) remarked that morphing the institutional culture by, “getting rid of the idea that ‘it’s not as good as an education [here]...” could change STEM students’ attitudes about SA.

Why did you decide to not SA?

No-SA students raised two major issues prompting their decision to remain at Welsh: the potential negative impact on their academic work, and the difficulty of planning and scheduling remaining classes. “I felt like my education would be compromised,” Darla (personal communication, April 4, 2013) revealed. “I am here to get a [specific] education, so why leave for a semester?” For instance, one No-SA student believed that choosing SA would eliminate participation in potentially meaningful practical research experiences like the program called Research Experiences for Undergraduates that occurs at U.S.-based universities. Moreover, Mikela (personal communication, January 31, 2013) planned to go

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No-SA students emphasized leeringness regarding their academic work at Welsh being compromised by SA. For instance, one student shared that a course she wanted to take at the Welsh was offered only once every two years. Studying abroad would impede her ability to take it. “My career path was headed toward that class, and I had to make a decision” (Lesley, personal communication, January 31, 2013). Having to take last-minute classes senior year made her nervous, as did the uncertainty of what courses from abroad would yield the required academic credit at Welsh College. **Were there particular elements of your college education that you felt would be hindered or not as developed if you had studied abroad?**

No-SA students consistently speculated that any STEM education received abroad would not measure up to Welsh's academic caliber and rigor. Lesley (personal communication, January 31, 2013) summarized it well, saying "You hear how great [Welsh College's] classes are, and I worried that I would not get that at other places. Some people go abroad for a break, but I was sure I'd miss the education." She added, "The cultural exchange would have been nice, but it was not worth it."

How did the notion of the *college bubble* impact your decision to not study abroad? To what extent do you think this *bubble* steers students to or from the SA program?

No-SA students often characterized the bubble that defines campus life at Welsh College as "addictive." For many of these students, the tenor of the social and academic climate is safe, nurturing, and comprised of like-minded students and faculty to such a degree that students often feel reluctant to venture far from its protective confines. "Many people who think about it as freshmen and sophomores decided that they don't want to leave their friends" (Bella, personal communication, April 4, 2013). While one No-SA student indicated that the notion of the bubble was heavily contemplated when considering SA, this student ultimately remained in the close-knit, insular Welsh community. Several students revealed their decision to attend college far from home was a way in which they emerged from an earlier less-congruent bubble. Lillian (personal communication, January 31, 2013) shared "[Welsh] is such a good fit for me ... I feel I kind of got out of a bubble by leaving my home state. The bubble at this college is much more diverse than the one I came from!"

Given this, it is not surprising that No-SA students frequently mentioned this "addictive" nature of the Welsh environment. "Many people who think about it as freshmen and sophomores decided that they don't want to leave their friends" (Bella, personal communication, April 4, 2013). Darla (personal communication, April 4, 2013) noted "once you become a junior or senior at this college you become jaded... [and] the bubble here is predominately a 'white' bubble; we don't get much diversity here." Bella (personal communication, April 4, 2013) concluded "More students should be encouraged to go abroad because it's a valuable experience. It relates to the mission statement, speaking to the understanding of the impact of our work on society. It is really important."

Ultimately, students confirmed that the institutionalized, negative stigma attached to SA at Welsh was the real deterrent, which could only be changed with the advent of a significant cultural shift. No-SA students suggested that Welsh College should modify the academic program so that SA would not be perceived as a break. This could help to ensure their college curricula matched with or complemented programs abroad more seamlessly. It is important to note that No-SA students did not mention financial burdens as a primary factor or negative influence on their final decision regarding SA opportunities.

CONCLUSIONS AND IMPLICATIONS

The students interviewed in this study enumerated many common themes that impacted their individual decision to study abroad while enrolled at Welsh College. These themes included the allure of remaining within the Welsh College bubble, challenges in ensuring the completion of their undergraduate program within four years, inconsistent faculty and academic department support, and both the pressures and encouragement of peers and family. The themes discussed in this study define not only ways in which institutional culture can impact STEM SA decision-making but also methods for and pathways with which student affairs educators, faculty and academic departments could consider adapting SA to better match the needs of STEM students, particularly those in institutional cultures that highly impact individual decision-making patterns. This is in line with Ziglar's (2018) astute observation regarding how college presidents must develop a sense of the institution's "inner soul" upon arrival to inform their decision-making processes so that they are aligned with the organizational culture (and therefore its symbols). This notion can be transferred to other institutional stakeholders, particularly to students and student affairs educators.

While many previous studies have focused solely on students who choose to study abroad, this study distinctively includes SA and No-SA students who went through the formal informationseeking stage. Within the guise of this sample, the latter group is vital to include because STEM students often have additional barriers. These barriers include highly-structured and rigid academic programs and opportunities in comparison to non-STEM students that may complicate their decisions (Klahr, 1998; Parkinson, 2007).

The literature regarding the practice of study abroad among STEM students is limited. As such, this study that focused on the culture of this practice on one STEM liberal arts campus is important because it expands and adds to the small body of literature on STEM students' study abroad experiences. In addition, this study advanced STEM SA decisionmaking processes through a specific organizational culture lens: a STEM liberal arts college.

This study adds to Parkinson's (2007) engineering-focused SA work that revealed the importance of strong SA support from the upper administration at the institution. Invoking Hartley and Morphew's (2008) important observation that colleges with deeply-entrenched institution-level purposes may be resistant to altering them, it is quite evident that strong support needs to emerge from diverse constituents in the bubble to encourage affirmative SA decision-making. Hence, as suggested by Niemann (2010), it should be the "co-responsibility" of not only leaders and staff, but also students and other institutional stakeholders to devise mechanisms for supporting SA decision-making processes.

Nevertheless, one might conclude that SA staff and other student affairs educators may need to consider ways in which to monitor the institutional culture regarding SA to better match students' programmatic and support-level/decision-making needs.

This study's outcomes can be useful to a variety of stakeholders who impact STEM student SA decision-making including: STEM institutions or respective STEM departments on college campuses, SA and student affairs educators, STEM professors, researchers and practitioners in the field of SA. Similarly to Netz's (2013) work, this study revealed the importance of constituents aiding students through the decision-making threshold. In particular, those working in SA offices and other student affairs offices can consider ways to gauge and tap into the culture of the institution to better understand how to best support, respond, and adapt practices to students' SA interest-level, questions and aspirations. It may also lead student affairs educators to be more keenly aware of the symbols (in various forms) that signify the organizational culture and possibly even subcultures within the college. Perhaps, this study may even enhance interest in student affairs educators engaging across stakeholder groups within their institutions to better gauge co-curricular involvement interest occurring through their work areas.

This study's theoretical framing, based on Love's (1990) notion of organizational symbolism, can be used as an illustration for others doing student affairs-based research on institutional culture. It can be particularly useful when making meaning of deeply entrenched organizations with shared values and assumptions that impact decisions made by stakeholders within the institution. Furthermore, future research on the impacts of institutional culture on SA (and other areas of student affairs) could benefit the ways in which STEM students are impacted and supported through decision-making processes. Finally, studies that focus more acutely on other constituents' reasons for supporting/not supporting STEM SA may further inform SA program officers and other student affairs educators on how to develop SA programs that these constituents can support.

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