Improving Education in Agricultural Biosciences through Studying Abroad in the United States†

Phillip R. Myer1*, David Ader2, and Tom Gill2
1Department of Animal Science, University of Tennessee Institute of Agriculture, Knoxville, TN 37996
2Smith Center for International Sustainable Agriculture, University of Tennessee Institute of Agriculture,
Knoxville, TN 37996

Studying abroad in agricultural biosciences can develop students’ cultural, academic, and communication skills and enhance employability. However, in the United States, discussions of study abroad are limited to either one-way directionality (U.S. students to other countries) or to the experiences of international students who come to the United States for degree programs. We analyzed the perspectives and experiences of studying abroad by Zamorano University (Honduras) students who completed an agricultural bioscience pasantía (four-month internship) during the final year of their undergraduate program. We used mixed methods to collect data via focus group discussions and a survey with Zamorano students who had completed a pasantía in 2017, as well as key informant interviews with Zamorano pasantía coordinators. Study-abroad experiences were compared between students who completed their pasantía in the United States (37%) and those who completed their pasantía in any of 17 other countries worldwide. Significant relationships were identified (p < 0.05) between: doing a pasantía in the United States (compared with going elsewhere) and improving science and theoretical knowledge; having a hands-on experience and science and theory improvement; improving communication and confidence in using scientific methods. The Zamorano pasantía model lends insights into the value of study abroad for agricultural bioscience education.

INTRODUCTION

Study abroad is widely promoted as beneficial to student learning, individual growth, and the development of global competencies. It is because of these benefits that study abroad has been considered a critical component for higher education in a greater globalized society. Studies have demonstrated that students from U.S. institutions...
who study abroad develop a deeper understanding of global issues and greater respect for them (1–4), more favorable attitudes toward other cultures (5, 6), stronger intercultural communication skills (7, 8), improved personal and professional self-image (9), and better foreign language skills (10, 11). In addition, surveys of former study-abroad participants consistently indicate that they believe the experience improved their self-confidence, ability to handle ambiguity, insight into their own value systems, and overall maturity (2, 12). These benefits to studying abroad also likely impact future employment, as studies have shown that such programs increase the probability of employment within three years of graduation (13).

The benefits of studying abroad apply as much to students studying in agricultural bioscience-related programs as to those in other disciplines (14). Global trade is the greatest area for growth in American agribusiness (15), and international awareness is a primary concern for agricultural students entering the workforce. Similarly to many other science-minded students, individuals engaged in agricultural biosciences rely on applying advanced science concepts in the field in order to become work-ready graduates. Applying this deep knowledge of agricultural biosciences gained through traditional collegiate study in tandem with international awareness permits students to enter the global workforce. Indeed, studies have shown that students in agricultural biosciences benefit from studying abroad via cultural skills enhancement, improved academic skills, enhanced employability, and improved communication skills (15).

Although the benefits of study abroad are well documented, discussions in the United States of short-term study-abroad programs often assume one-way directionality: students from U.S. institutions traveling overseas. This dominant narrative in study abroad has left little room for research on the experiences in science education of students from outside the United States traveling to the United States for short-term study abroad. Moreover, while studies have addressed the perceptions and competencies of students abroad enrolled in an undergraduate or graduate degree program in the United States (16–19), they fail to address those of students who study in the United States on a short-term basis (< 6 months). Short-term (rather than long-term) study abroad may alleviate the concern about such students leaving their home country and not. This is a significant concern surrounding international student mobility and its impacts on economic development (20). Most research on study abroad focuses on benefits to student soft skills, such as global competence, intercultural awareness, and increased historical, geographic, and social knowledge of their study-abroad destination. For those in the arts and social sciences, this may meet goals of improved knowledge from study-abroad experiences. However, for the technical sciences, such as disciplines in the agricultural biosciences, a gap in the literature exists on the impact of study abroad on improved scientific knowledge and increased student perceptions of their scientific knowledge.

To address these critical gaps, we hypothesized that perceptions of scientific education would be enhanced in students from outside the United States studying abroad within the United States. In this study, we aimed to learn how to improve the situation, research, and education of students studying abroad in the agricultural biosciences by asking the following key research questions: 1) whether scientific knowledge improved, 2) whether theoretical knowledge improved, and 3) whether confidence in using the scientific method improved. Our population was a group of students from Zamorano Pan-American Agricultural School (Escuela Agrícola Panamericana El Zamorano) in Honduras, a leading agricultural sciences university in the Americas. Zamorano students are required to complete a four-month internship (pasantía) in the last year of their program. By analyzing students’ experiences from a top agricultural university with a focus on experiential learning, we explored a new perspective to validate ongoing research in science education and study-abroad programs.

**METHODS**

All study procedures and protocols were approved by the University of Tennessee Institutional Review Board, UTK IRB-17-04016-XM. Multifaceted research questions and complex issues require inquiry of breadth and depth, and by using a mixture of methods, we confirmed data through triangulation and created an interactive process that broadened our understanding of students’ experiences (21, 22). Data were collected concurrently in November 2017 through qualitative key informant (KI) interviews (23) of Zamorano faculty coordinators organizing the experiences, together with focus group discussions (FGDs) and quantitative surveys with Zamorano students (2, 24) (Appendices I and 2). The students interviewed and surveyed, representing 15 countries (Fig. 1), all participated in a study-abroad experience (called “pasantía”) in 2017, their final year (21, 25).

Key informant interviews were conducted with the four coordinators of the pasantías, who are responsible for evaluating students before and after the abroad experience. These interviews lasted one hour on average and were conducted in English and/or Spanish. Focus group discussions were also used to gather qualitative data on the experience of students studying abroad and how this impacted their bioscience education. This method provided the opportunity to gather in-depth data, with participants being able to spark ideas by discussing with each other. Five FGDs were conducted with three groups of four students, one group of five students, and one group of six. Each FGD was held on Zamorano’s campus in a classroom with students who had studied abroad in the past year. The five FGDs lasted an average of 50 minutes each and were conducted in Spanish. Finally, a quantitative survey instrument was administered to Zamorano students (N = 136) from the 2017 cohort who studied abroad. The survey responses were analyzed using...
SPSS version 24. The students participated in programs in 18 countries, with 37% of the students traveling to the United States (Fig. 2).

This unique dataset allowed us to examine the study-abroad experiences of agricultural bioscience students, in a direction not usually studied (students traveling to the United States) and across an understudied time scale (a short-term experience). This research is critical for addressing gaps in understanding the relationship between study abroad and science education specifically. Limitations do exist, as the quantitative data are self-reported perceptions. We did not measure actual gains in knowledge but rather how students perceived the benefits of the pasantía. Potential bias exists for qualitative informants to respond positively about pasantías as they are responsible for setting up the pasantías. However, we focused on the Key Informant views about pasantías relating specifically to science and theory, not whether they were positive or negative.

RESULTS

We address our main research questions by presenting the results of the quantitative survey first, followed by the qualitative data to provide context about the research.

Quantitative survey results

Table 1 presents the descriptive summary of a select portion of the survey data. In the survey, the students were presented with various statements and asked to what extent they agreed with the statements. More than a third of students strongly agreed with the statements: “My knowledge of science improved through my pasantía,” “My confidence in using the scientific method increased,” and “My theoretical knowledge increased.” Half of the students strongly agreed that their pasantía was hands-on and improved their communication skills.

For analysis, the respondents were divided into two groups: those who went to the United States for a pasantía versus those who went elsewhere. Chi-squared tests of significance were calculated to determine the statistical differences. Table 2 presents the differences in reporting strong agreement with various statements about the pasantía. Approximately 52% of those traveling to the United States strongly agreed with the statement that their science knowledge improved, compared with only about 28% of those who went elsewhere (p < 0.01). Theoretical knowledge improvement and confidence in using the scientific method were different between the two...
groups, with students going to the United States agreeing more with the statements, although the difference was not statistically significant.

Regression analyses

Logistic regression models were calculated using binary dependent variables, where students were given a score of 1 if they strongly agreed with a statement, and all other responses were given 0. Table 3 presents results of students who strongly agreed that their science knowledge improved (compared with all other respondents) as the dependent variable, controlling for whether they went to the United States or elsewhere. Subsequent models control for age, sex, rural residence, and whether they have ever left their home country before starting at Zamorano. Pasantía to a university, strongly agreeing that the pasantía was hands-on, and strongly agreeing that the pasantía helped improve communication skills were variables also included in the final model (Model 3). In the bivariate model (Model 1), students who completed the pasantía to the United States were almost three times as likely to strongly agree that their science knowledge improved ($p < 0.01$). After controlling for demographics (Model 2), those going to the United States were almost four times as likely to strongly agree ($p < 0.01$). In Model 3, students who completed the pasantía to the United States were no longer significantly more or less likely to strongly agree. However, pasantías to universities ($p < 0.05$) and those who thought their pasantía was hands-on ($p < 0.01$) were significantly more likely to strongly agree that their science knowledge improved. Tables 4 and 5 present the same models with the only differences being in the dependent variable. Table 4 presents the likelihood of strongly agreeing with the statement that their confidence in using the scientific method improved, and Table 5 presents models showing the likelihood of strongly agreeing with the statement that theoretical knowledge improved.

TABLE 2.
Differences in agreement between pasantías in the United States versus other places.

| Strongly agree that                                      | United States | Other |
|----------------------------------------------------------|---------------|-------|
| Science knowledge improved                               | 52.1          | 27.5$^b$|
| Theoretical knowledge improved                           | 54.2          | 31.7 |
| Confidence in using scientific method improved           | 43.8          | 29.3 |
| Experience was hands-on                                  | 70.8          | 42.7$^b$|
| Planning to go to graduate school                        | 68.9          | 41.3$^b$|
| Pasantía met my expectations                             | 47.9          | 23.5$^b$|
| Yes I would return to live there                         | 66.0          | 45.7$^c$|
| Communication improved                                   | 64.6          | 42.7$^c$|
| Work was interesting                                     | 66.7          | 40.2$^c$|
| Work was relevant                                        | 52.1          | 41.5 |
| Experience was rewarding                                 | 44.7          | 34.6 |

$n = 136$

$^a$Key research questions

$^b p < 0.01$

$^c p < 0.05$

TABLE 3.
Logistic regression models; strongly agree science knowledge improved.

| Model | Pasantía to United States | Female | Age | Rural | Never left home | Pasantía to university | Strongly agree communication improved | Strongly agree hands-on |
|-------|---------------------------|--------|-----|-------|----------------|------------------------|----------------------------------------|------------------------|
| Model 1 | 2.87$^a$             | 0.72   | 1.11 | 0.96  | 1.07          | 4.27$^b$               | 0.63                                   | 7.84$^a$               |
| Model 2 | 3.74$^a$             | 0.62   | 1.21 | 1.24  | 1.12          |                        |                                        |                        |
| Model 3 | 1.32                  |        |     |       |               |                        |                                        |                        |

$n = 136$

Nagelkerke R squared

2-log likelihood

|       | 0.08  | 0.12  | 0.35  |
|-------|-------|-------|-------|
|       | 160.57| 142.22| 188.55|

$^a p < 0.01$

$^b p < 0.05$
Key informant interviews

The coordinators of the study-abroad programs all reported that the pasantías were great opportunities for students to gain hands-on experience, improve their communication skills, and gain confidence in their abilities. They agreed with previous research that suggests students who study abroad gain a better global perspective. The coordinators also agreed that a majority of the learning was related to student soft skills, such as global competence, intercultural awareness, and increased historical, geographic, and social knowledge of their study-abroad destination.

However, our interest was in the relationship between science knowledge and study abroad. When asked about the benefits to the agricultural biosciences, there was disagreement as to whether there was a direct influence on bioscience education. One coordinator suggested that while many study-abroad programs offered benefits, the impact on science education was directly dependent on location:

It really depends on where the student goes for the pasantía, whether or not it will improve their science knowledge. Some organizations don’t offer as many opportunities as others, especially for work in a lab, for example. Of course the student will gain some insights and experience, but how related it is to science is going to depend on where they are working. (Coordinator 1)

Another coordinator expanded on this idea and claimed it was not just location, but student disposition, that mattered:

Some students really seek out the opportunity to learn more scientifically rigorous practices. Those are the ones who improve, especially in their science knowledge. Some students, though, are tired of classroom- and lab-type environments, and they want to get out there and see other opportunities. That doesn’t mean they don’t improve, but they might not be improving their laboratory skills. (Coordinator 2)

The coordinator was pressed to elaborate on how they conceive of science, and the conflation between science and laboratory work, in their statement. They explained that “Science, of course is more than a lab, or lab work. But even if the pasantía is not in a lab, the students often improve their critical thinking skills, and that improves their science skills. One thing [the pasantía] does do is help increase the students’ confidence” (Coordinator 2).

Despite the benefits of study abroad, the coordinators also reported some challenges. All coordinators reported the challenge of the availability of financial resources for the students. Many students coming from rural Latin America lack financial resources to afford to study in more expensive places like the United States. Language and cultural

| TABLE 4. | Logistic regression models; strongly agree confidence in using scientific method improved. |
|-----------|----------------------------------------------------------------------------------|
|           | Model 1 | Model 2 | Model 3 |
| Pasantía to United States | 1.88 | 1.97 | 0.58 |
| Female | 0.51 | 0.51 | |
| Age | 0.91 | 0.82 | |
| Rural | 1.25 | 1.94 | |
| Never left home | 0.46 | 0.42 | |
| Pasantía to University | 3.33<sup>a</sup> | | |
| Agree communication | | 4.38<sup>a</sup> | |
| Agree hands-on | | 2.29 | |
| <sup>n</sup> | 136 | 136 | 136 |
| Nagelkerke R squared | 0.029 | 0.1 | 0.34 |
| 2-log likelihood | 164.93 | 141.43 | 118.19 |

<sup>a</sup> p < 0.05

| TABLE 5. | Logistic regression models; strongly agree confidence in using scientific method improved. |
|-----------|----------------------------------------------------------------------------------|
|           | Model 1 | Model 2 | Model 3 |
| Pasantía to United States | 2.55<sup>a</sup> | 3.06<sup>b</sup> | 1.46 |
| Female | 0.54 | 0.45 | |
| Age | 1.11 | 1.09 | |
| Rural | 1.08 | 1.44 | |
| Never left home | 1.32 | 1.38 | |
| Pasantía to University | 1.88 | | |
| Agree communication | | 1.74 | |
| Agree hands-on | | 3.61<sup>a</sup> | |
| <sup>n</sup> | 136 | 136 | 136 |
| Nagelkerke R squared | 0.064 | 0.11 | 0.13 |
| 2-log likelihood | 168.65 | 148.91 | 146.42 |

<sup>a</sup> p < 0.05  
<sup>b</sup> p < 0.01
transitions were also cited as significant challenges for the students, particularly when traveling abroad from regions of relatively low resources to regions of greater resources. The coordinators recognized that the resource levels between Zamorano and other organizations in the United States are different and that one of the benefits of study abroad is experiencing the varying levels of resources, specifically technology used in science. One coordinator reported that students often brag to other students when they return about the technology they used during the pasantía. However, upon returning to their home countries, students may not have the opportunity to use similar levels of technology (Coordinator 1). The other coordinators were then asked about the benefit of learning advanced technologies if the students potentially would not have access to those technologies. The coordinators expressed some concern, but did not see it as a major negative aspect of the pasantía, explaining, “It’s nice for the students to know what is out there, what the cutting-edge technology looks like. It may even entice them to continue studying” (Coordinator 4).

Focus group discussions

All FGDs reported that the pasantías were great opportunities for students to gain general life experience. They all suggested it helped them to improve their communication skills, especially those who went to the United States. They agreed with the research that suggests that students become more confident and gain enhanced global perspectives. They also agreed that some of the more impactful events of the pasantía related to soft skills, such as intercultural awareness and cultural learning, regardless of which country they visited for the pasantía. Related to the benefits the pasantía brings to their bioscience education, all FGDs agreed that going to the United States provided greater access to technology and opportunities to learn. One student reported being surprised “by the advances in technology, especially at my pasantía at the university.” Students also recognized the differences in resources and investment in science education. One respondent, who did a pasantía at a U.S. university stated, “I felt like a kid in a candy shop going to work those first few weeks. There were so many more machines and levels of technology. I really was excited by all the things we could do. I was excited to be in a place that has so much investment in research and technology.”

The groups noted the benefits of studying abroad in a more technologically advanced lab, with more to learn and more research questions that could be addressed. One student, however, questioned the direct benefit of always using cutting-edge technology, if the basic science methods were not taught well:

When I started my pasantía at [a U.S. university], I was so happy to be working in a lab with such advanced technology. There were many times when

I wanted to do more advanced work [at Zamorano], but we didn’t have access to the same level of technology. But some of my American colleagues never had to learn how to do the basic science in a limited lab like where I grew up and like we do at Zamorano. I feel like my classmates at Zamorano had a better grasp of the basic science than some of our American counterparts. Sure the Americans knew the machines more, but they didn’t always know what the machines were actually doing.

This student highlighted the complexity of science education and the relationship to technology and study abroad. The benefits to bioscience education of participating in study abroad could be vast, but the benefits may be tempered by the previous quantity and quality of science education. Exposure to technology and more-resourced labs may help, but it is not sufficient to successfully improve bioscience education.

DISCUSSION

The quantitative results show that a significant relationship existed between doing a pasantía in the United States (compared with going elsewhere) and improving science and theoretical knowledge. However, after controlling for other variables, the relationships ceased to be statistically significant. Other relationships, however, became apparent. There was a significant relationship between having a hands-on experience and science and theory improvement, as well as a significant relationship between improving communication and confidence in using scientific methods. Although not conclusive, these results help elucidate the relationships between science education and study abroad. In the qualitative results, students reported that their pasantía enhanced their learning in a variety of topics, including science. Students also reported that they felt more confident with using the scientific method after having studied abroad. However, the most gains in science knowledge were evident in students who spent time in a science-oriented organization, such as a university. It must be noted that these were perceived gains, not direct student gains. With increased emphasis on study abroad as a way to enhance university education, it is logical to question the role of study abroad on science education. Our results suggest that study abroad could enhance scientific knowledge and theoretical understanding and provide experiences that enhance confidence in engaging with the broader scientific community.

The pasantía requirement for undergraduate students at Zamorano University presents a different model than that usually examined in international agri-science study abroad. The plethora of countries from which Zamorano recruits students, combined with the multitude of different locations (geographically and sectorally) in which these students complete their pasantías, highlights a comprehensive
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**REFERENCES**

1. Carsello C, Creaser J. 1976. How college students change during study abroad. Coll Stud J 10(3):276–278.
2. Carlson JS. 1990. Study abroad: the experience of American undergraduates. Greenwood Publishing Group, Westport, CT.
3. Douglas C, Jones-Rikkers CG. 2001. Study abroad programs and American student worldmindedness: an empirical analysis. J Teach Intl Bus 13:55–66.
4. Luo J, Jamieson-Drake D. 2015. Predictors of study abroad intent, participation, and college outcomes. Res Higher Educ 56:29–56.
5. Carlson JS, Widaman KF. 1988. The effects of study abroad during college on attitudes toward other cultures. Intl J Intercult Rel 12:1–17.
6. Kitsantas A. 2004. Studying abroad: the role of college students’ goals on the development of cross-cultural skills and global understanding. Coll Stud J 38(3):441.
7. Anderson PH, Lawton L, Rexeisen RJ, Hubbard AC. 2006. Short-term study abroad and intercultural sensitivity: a pilot study. Intl J Intercult Rel 30:457–469.
8. Williams TR. 2005. Exploring the impact of study abroad on students’ intercultural communication skills: adaptability and sensitivity. J Stud Intl Educ 9:356–371.
9. Cushner K, Mahon J. 2002. Overseas student teaching: affecting personal, professional, and global competencies in an age of globalization. J Stud Intl Educ 6:44–58.
10. Brecht RD, Davidson DE, Ginsberg RB. 1995. Predictors of foreign language gain during study abroad, p 37–. In Freed BF (ed), Second language acquisition in a study abroad context. John Benjamins Publishing Company, Amsterdam.
11. Freed BF. 1995. Second language acquisition in a study abroad context, vol 9. John Benjamins Publishing, Amsterdam.
12. Lindsey EW. 2005. Study abroad and values development in social work students. J Soc Work Educ 41:229–249.
13. Di Pietro G. 2015. Do study abroad programs enhance the employability of graduates? Educ Fin Pol 10:223–243.
14. Zhai L, Scheer SD. 2002. Influence of international study abroad programs on agricultural college students. J Intl Agric Ext Educ 9:23–29.
15. Hendrickson ML. 2015. Global mindedness and perceptions of study abroad among agriculture students pursuing associate’s and bachelor’s degrees at North Carolina State University. North Carolina State University, Raleigh, NC.
16. Akawana EE. 2015. International students in western developed countries: history, challenges, and prospects. J Intl Stud 5:271.
17. Wu HP, Garza E, Guzman N. 2015. International students’ challenge and adjustment to college. Educ Res Intl 2015:1–9.
18. Zhou J. 2015. International students’ motivation to pursue and complete a Ph.D. in the US. Higher Educ 69:719–733.

**SUPPLEMENTAL MATERIALS**

Appendix 1: Zamorano Study Abroad Survey Instrument  
Appendix 2: Zamorano Internship Coordinator Interview Guide

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**REFERENCES**

1. Carsello C, Creaser J. 1976. How college students change during study abroad. Coll Stud J 10(3):276–278.
2. Carlson JS. 1990. Study abroad: the experience of American undergraduates. Greenwood Publishing Group, Westport, CT.
3. Douglas C, Jones-Rikkers CG. 2001. Study abroad programs and American student worldmindedness: an empirical analysis. J Teach Intl Bus 13:55–66.
4. Luo J, Jamieson-Drake D. 2015. Predictors of study abroad intent, participation, and college outcomes. Res Higher Educ 56:29–56.
5. Carlson JS, Widaman KF. 1988. The effects of study abroad during college on attitudes toward other cultures. Intl J Intercult Rel 12:1–17.
6. Kitsantas A. 2004. Studying abroad: the role of college students’ goals on the development of cross-cultural skills and global understanding. Coll Stud J 38(3):441.
7. Anderson PH, Lawton L, Rexeisen RJ, Hubbard AC. 2006. Short-term study abroad and intercultural sensitivity: a pilot study. Intl J Intercult Rel 30:457–469.
8. Williams TR. 2005. Exploring the impact of study abroad on students’ intercultural communication skills: adaptability and sensitivity. J Stud Intl Educ 9:356–371.
9. Cushner K, Mahon J. 2002. Overseas student teaching: affecting personal, professional, and global competencies in an age of globalization. J Stud Intl Educ 6:44–58.
10. Brecht RD, Davidson DE, Ginsberg RB. 1995. Predictors of foreign language gain during study abroad, p 37–. In Freed BF (ed), Second language acquisition in a study abroad context. John Benjamins Publishing Company, Amsterdam.
11. Freed BF. 1995. Second language acquisition in a study abroad context, vol 9. John Benjamins Publishing, Amsterdam.
12. Lindsey EW. 2005. Study abroad and values development in social work students. J Soc Work Educ 41:229–249.
13. Di Pietro G. 2015. Do study abroad programs enhance the employability of graduates? Educ Fin Pol 10:223–243.
14. Zhai L, Scheer SD. 2002. Influence of international study abroad programs on agricultural college students. J Intl Agric Ext Educ 9:23–29.
15. Hendrickson ML. 2015. Global mindedness and perceptions of study abroad among agriculture students pursuing associate’s and bachelor’s degrees at North Carolina State University. North Carolina State University, Raleigh, NC.
16. Akawana EE. 2015. International students in western developed countries: history, challenges, and prospects. J Intl Stud 5:271.
17. Wu HP, Garza E, Guzman N. 2015. International students’ challenge and adjustment to college. Educ Res Intl 2015:1–9.
18. Zhou J. 2015. International students’ motivation to pursue and complete a Ph.D. in the US. Higher Educ 69:719–733.
19. Mesidor JK, Sly KF. 2016. Factors that contribute to the adjustment of international students. J Intl Stud 6:262.
20. Berry C, Taylor J. 2014. Internationalisation in higher education in Latin America: policies and practice in Colombia and Mexico. Higher Educ 67:585–601.
21. Tashakkori A, Teddlie C. 1998. Mixed methodology: combining qualitative and quantitative approaches, vol 46. Sage, Thousand Oaks, CA.
22. Creswell JW, Plano Clark VL, Gutmann ML, Hanson WE. 2003. Advanced mixed methods research designs, p 209–240. In Tashakkori A, Teddlie C (ed.), Handbook of mixed methods in social and behavioral research. Sage Publications, Thousand Oaks, CA.
23. Schenker MB, Castañeda X, Rodriguez-Lainz A. 2014. Migration and health. A research methods handbook. University of California Press, Oakland, CA.
24. Merton RK, Kendall PL. 1946. The focused interview. Am J Sociol 51:541–557.
25. Creswell JW, Garrett AL. 2008. The “movement” of mixed methods research and the role of educators. S African J Educ 28:321–333.
26. Baruch Y, Budhwar PS, Khatri N. 2007. Brain drain: inclination to stay abroad after studies. J World Bus 42:99–112.
27. Han X, Stocking G, Gebbie MA, Appelbaum RP. 2015. Will they stay or will they go? International graduate students and their decisions to stay or leave the United States upon graduation. PLOS One 10:E0118183.