Guided Journaling: Focused Writing to Enhance Learning during a STEM Short-Term Study Abroad Course

DARLENE PANVINI

ABSTRACT

More students are enrolling in STEM short-term study abroad courses, yet the structure of these programs poses pedagogical challenges for faculty needing to cover an entire course in a few weeks. Challenges include lack of pedagogical resources and research, the need to intentionally intervene to structure learning so that students can process, connect, and reflect to promote deeper thinking; little time for preparation or content front-loading; and finding balance between faculty-led instruction and experiential activities. To address these challenges while teaching a short-term study abroad course in Costa Rica, daily guided journaling worksheets (GJWs) fostered learning through intentional writing by sharpening student focus, connecting study abroad experiences with concepts from the texts, capturing thinking, promoting student reflection, and elucidating student concerns. The GJWs incorporated thinking routines, content graphic organizers, and a variety of writing prompts. Overall, the GJWs documented student learning in a format that allowed for prompt assessment and feedback while overcoming some of the challenges related to teaching a short-term study abroad course. With relevant and situational modifications, GJWs can be a beneficial tool for other types of experiential teaching situations such as internships, practicums, co-ops, field trips, laboratory activities, and community-based learning.

Key Words: interdisciplinary/integrated instruction; learning science in the field; study abroad; writing.

Introduction

An increased focus on experiential learning has resulted in more study abroad courses for undergraduates. In 2016–17, more than 332,000 students from the United States studied abroad (a 2.3% increase over the previous year), and many students (25.8%) are taking STEM courses (Institute of International Education, 2018). Study abroad experiences vary in length, ranging from short-term to year-long programs.

Short-term programs (two to three weeks) attracted 65% of students studying abroad (Institute of International Education, 2018). However, these programs can pose pedagogical challenges for faculty, since an entire course is covered in a few weeks. These challenges include few instructional resources, misaligned student-faculty expectations, time constraints, the need for different teaching methodologies, and inadequate assignments to foster deep learning that links theory to practice.

STEM faculty may have difficulty finding resources to support their teaching needs. Most of the literature on best practices for study abroad programs is focused on language development, student acculturation, or student adjustment (Smith & Vandermaas-Peeler, 2009). Content-specific textbooks relating to the specific geographic area of study may be lacking.

Student expectations may not differentiate study abroad trips from vacations. Not understanding the trip’s goals can result in insufficient learning while immersed in the study abroad experience. Instructors may need to intentionally promote learning by helping students make connections between experiences and course content (Vande Berg et al., 2012).

The fast pace of short-term programs creates time constraints that result in difficulty achieving the typical three phases of study abroad courses: prepare, participate, and reflect (Smith & Vandermaas-Peeler, 2009). Since short-term programs do not allow for much content front-loading or post-trip reflection, all three phases must be completed simultaneously. This limitation, plus the intensity of short-term programs, demands that both students and faculty devote significant attention to the learning components, which include faculty-led classes, experiential activities, studying, preparation, and grading. Additional time-related factors impacting student learning and faculty workload include travel, trip detail coordination, cultural experiences, and relaxation.

Faculty may need to incorporate different instructional methodologies, since standard techniques of conveying content may not work as they attempt to balance time for both teaching and experiential activities. Additionally, some STEM-specific challenges may be magnified on a study abroad trip with the shift toward more experience-based learning and less traditional classroom instruction. Challenges can include the use of vocabulary-heavy texts, students with inadequate science backgrounds, negative perceptions of science.
from pre-travel readings, all assessments were completed in-country; \( \ldots \) experiential activities interspersed with faculty-led classes. Aside from travel to several locations in Costa Rica, with numerous non-science majors. Several pre-departure sessions were focused on the learning goals of the course, reminding them who ranged from sophomores to seniors, including science and sustainability concepts.

Assignments used in traditional classroom settings may not work on a study abroad trip due to limited access to copy machines, internet, and time for assignment completion and grading (Carleton University, 2019). Journaling is commonly used on study abroad trips for students to capture intercultural experiences, reactions, and reflections. Journals can also be used to record discipline-specific experiences and content. However, open-ended or free-write journaling may not get students engaged in the kind of “high-leverage thinking” (Ritchhart et al., 2011, p. 11) that will foster understanding, so the use of intentional and focused prompts that reveal student thinking is needed.

To address these challenges on a short-term study abroad course, guided journaling worksheets (GJWs) were developed using thinking routines, graphic organizers, and a variety of prompts. These intentional components in the GJWs supported the pedagogical goal of getting students to articulate connections between their experiences and the course content while demonstrating proficiency in the course learning outcomes related to specific conservation and sustainability concepts.

The Study Abroad Experience & Course

Taught during a 2.5-week May term over four years, “Conservation and Sustainability of Costa Rica” averaged 12 students per session who ranged from sophomores to seniors, including science and non-science majors. Several pre-departure sessions were focused on packing, itinerary, safety, and trip-related specifics. The course included travel to several locations in Costa Rica, with numerous experiential activities interspersed with faculty-led classes. Aside from pre-travel readings, all assessments were completed in-country and included the GJWs (35%), exam (20%), project (35%), and participation (10%).

Guided Journaling Worksheets

GJW goals aimed to promote deep thinking through intentional writing by sharpening student attention, connecting study abroad experiences with concepts from the texts, encouraging thinking and observing, promoting reflection, and elucidating concerns. These elements kept students focused on the learning goals of the course, reminding them that this was a study abroad trip and not vacation travel. The GJW portfolio incorporated a variety of thinking routines (Ritchhart et al., 2011), graphic organizers (Struble, 2007), and prompts. The mixture of these components in the GJWs supported the learning of non-science majors while providing opportunities for majors to build on their existing science knowledge.

The GJWs were distributed as a packet to students at the beginning of the trip. Students individually completed a one-page, front-back GJW each day using their notes, texts, and trip experiences. They also documented key terms, important concepts, and species of interest daily (Figure 1). Depending on travel and course activities, GJWs were collected daily or on alternate days. The GJWs provided the basis for instructor-led discussions when class sessions were held. The format of the GJWs allowed for quick grading so that they were returned to students within one day. GJW grades were based on degree of completion, as well as complexity and correctness of responses. Students often used the GJWs to convey anxieties about intercultural aspects of the trip and their overall well-being. Therefore, in addition to clarification of content-based misconceptions, instructor feedback also acknowledged student concerns, providing encouragement and/or intervention as needed.

Thinking Routines

Thinking routines are used “as tools, as structures, and as patterns of behavior” (Ritchhart et al., 2011, p. 45) to stimulate, support, and practice thinking while making thinking more visible. Typically used during class time, thinking routines provide ongoing, regular opportunities for students to engage in, share, and reflect on their thinking. Details of thinking routines can be found at Ritchhart et al. (2011). The GJWs utilized 13 different thinking routines from three categories (Table 1).

Thinking Routine Implementation

Thinking routines were intentionally implemented in a variety of ways to support, provoke, and uncover student understanding at different points in the course.

- Early in the course, routines elicited student thinking about issues prior to exposure to course content. For example, “Think-Puzzle-Explore” prompted students to consider what they already knew and questions they had about environmental problems in Costa Rica and how they might explore these questions. Their responses structured future class discussions as students gained more knowledge throughout the trip.
- Midway through the course, routines helped students think about and get feedback on major assignments (Figure 2).
- Several routines (Figure 3) provided opportunities for students to creatively make connections between experiences and texts, a major course goal. The mix of science and non-science majors resulted in interdisciplinary class discussions that often led to considerations of the role of science in society, especially in the intercultural context of the trip.
- Thinking routines guided students to unpack apprehension regarding intercultural activities. For example, students initially had concerns regarding the overnight homestay with a local family, but afterward rated this experience as highly meaningful. The thinking routine “I Used to Think . . . Now I Think . . .” provided a venue for students to reflect, synthesize, and explore their thoughts after the homestays. Class discussion revealed how their thinking changed, resulting in favorable attitudes about this intercultural experience.
- Routines requiring students to closely examine their texts or listen with intention to a speaker (Figure 4) helped students stay
attentive to learning, recognize key concepts, and question claims. As students applied this knowledge, discussions about their study abroad experience further differentiated it from vacation travel and students pondered how they could incorporate elements of sustainability and conservation on future personal trips.

Routines implemented toward the latter part of the trip encouraged students to examine experiences from different perspectives while requiring synthesis and application of previously learned knowledge to novel situations (Figures 5 and 6). As science and non-science majors examined the complexity of environmental situations and the work of career scientists, they

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**Figure 1.** Sample of a one-page (front and back) guided journaling worksheet.

**Table 1.** Thinking routines (Ritchhart et al., 2011) used during a short-term STEM study abroad course, by category.

| Routines for Introducing & Exploring Ideas | Routines for Synthesizing & Organizing Ideas | Routines for Digging Deeper into Ideas |
|-------------------------------------------|---------------------------------------------|----------------------------------------|
| See-Think-Wonder                           | Headlines                                   | Circle of Viewpoints                   |
| Think-Puzzle-Explore                       | CSI: Color, Symbol, Image                   | Step Inside                             |
| 3-2-1 Bridge                               | Connect-Extend-Challenge                    | Claim-Support-Question                  |
| Compass Points                             | The 4C’s                                    | Sentence-Phrase-Word                    |
|                                           | I Used to Think . . . , Now I Think . . .   |                                        |

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- List 3 ways (each) in which the Butterfly Workshop and Bat Mint Netting relates to conservation and sustainability topics discussed in class or readings.

- "Write an "elevator speech" to explain the basic concepts of biophilia (Question 1 Critical Thinking & Discussion, p. 329).

- List 5-8 commonly used words with semantic vagueness that you have encountered on this trip (Question 6 Chapter Review, p. 345).

- After reading the article about the Frog Hunt, what question would you like to ask Mark Wainwright when we hear him talk later today?

- Describe some ways in which you have benefited through experiential learning on this trip that would not have been possible through traditional classroom learning (modified from Question 1 Chapter Review, p. 328).
better understood the relevance of the course content, thus developing more positive perceptions of science.

○ **Graphic Organizers**

Graphic organizers depict knowledge, ideas, and thoughts in a visual format, and the various types can provoke thinking and assess student learning (Struble, 2007). Conceptual graphic organizers require students to provide supporting evidence to demonstrate their knowledge; formats include tables, concept maps, and Venn diagrams. These devices require students to respond with precision and brevity. Therefore, graphic organizers can be used for quick and effective formative assessment (Struble, 2007), creating an ideal structure in the GJWs that maximized grading efficiency and timely feedback to students (Figure 7). The graphic organizers guided students to navigate vocabulary-laden texts and distill major concepts; these skills can help students build their scientific fluency. Designing thinking routines in a graphic organizer format prompted students to organize their thinking, capture their learning, and reflect on their experiences (e.g., Figures 5 and 6).

○ **Content-Specific & Reflective Prompts**

The GJWs included a variety of content-specific and reflective prompts. With fewer traditional class sessions, students needed to access and process content on their own from their texts or from speakers. GJW prompts required students to explain concepts, define terms, or make lists (e.g., Figure 1). Text-based prompts were often worded to explicitly ask students to draw on their experiences. For example, “List some commonly used words with semantic vagueness” from the text (Robertson, 2017, p. 345) was rewritten as “List 5–8 commonly used words with semantic vagueness you have encountered on this trip.”

The experiential components of a study abroad course can be intense for some students. As recommended by Smith and Vandermaas-Peeler (2009) and Savicki and Price (2017), the GJWs intentionally incorporated opportunities for students to contemplate and assign meaning to their learning experiences, for example:

- “What animals do you hope to see while in Costa Rica and why?”
- “Draw a picture (with your colored pencils) that describes your favorite moment so far in Costa Rica!”

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**Figure 2.** The thinking routine “Compass Points” prompts students to reflect on their progress related to the final project. The instructor met with each student to follow up on their comments here and provide guidance on the project as needed.
Capture the essence of Palo Verde and the Tempisque River. Draw a picture, write a poem, compose a song, create a list of birds you see, or somehow capture the essence of this place.

The final GJW included the essay prompt “What effect has this trip and this course had on your personal life, your beliefs, your values, and your previous understanding of conservation and sustainability?”

Guided Journaling Worksheets

Consider your experiences snorkeling and at Playa Hermosa to complete the chart below.

| Connect | Extend | Challenge |
|---------|--------|-----------|
| *What connections do you draw between this experience and things you already knew?* | *How has your thinking broadened, deepened, or expanded in some way as a result of this experience?* | *What challenges or questions have emerged now that you have had this experience?* |

Figure 3. The thinking routines “CSI” and “Connect-Extend-Challenge” provide opportunities for students to make connections between experiences, texts, and previously acquired knowledge. The CSI routine led to an interdisciplinary discussion of how symbols, colors, and images shape societal perceptions of sustainability and fostered discussion on the relevance and limitations of science in solving environmental problems.

- “Capture the essence of Palo Verde and the Tempisque River. Draw a picture, write a poem, compose a song, create a list of birds you see, or somehow capture the essence of this place.”
- The final GJW included the essay prompt “What effect has this trip and this course had on your personal life, your beliefs, your values, and your previous understanding of conservation and sustainability?”

Guided Journaling Worksheets Summary

Student feedback regarding the GJW workload included comments that were both positive (“took less time than writing papers or journals”) and negative (“too much busy work”). Specifying expectations for completing the GJWs, modifying unclear prompts, and
more intentionally aligning the GJWs with the texts and trip activities have reduced the number of negative comments over several iterations of the course. Several students voiced appreciation for the GJWs, acknowledging the benefit of capturing meaningful course content and trip details. These students tended to view the GJWs as a portfolio of their experiences that could be shared with others after the trip. Collecting the worksheets frequently and providing prompt feedback helped students gauge and modify their work habits to balance the demands of the trip.

With relevant modifications, the GJW format could be a beneficial tool for other types of experiential education strategies that require students to connect learning experiences with course content through observation, reflection, and application. STEM faculty often incorporate observation and application in inquiry-based laboratory activities and could use GJWs to foster these learning skills instead of traditional lab reports, while also adding opportunities for reflection. GJWs could also be developed for longer study abroad trips, internships, practicums, co-ops, field trips, and community-based learning, research, or service in any discipline. Like a short-term study abroad course, these types of experiential learning face challenges related to limited class time and access to resources, potentially misaligned student and faculty expectations, insufficient opportunities for reflection, and time constraints for both faculty and students to get the required work completed (Carleton University, 2019).

In summary, GJWs are an easily accessible tool for science and non-science majors to use, can help faculty achieve the pedagogical goals of a STEM short-term study abroad course, and are transferable to other experiential learning situations. The thinking routines, graphic organizers, and various prompts guide students’ reading, thinking, observing, and reflecting by asking them to make intentional associations between experiences and concepts. The GJWs capture student learning in a format that allows for prompt assessment and feedback, thus overcoming some of the

Figure 4. The thinking routines “Sentence-Phrase-Word” and “Claim-Support-Question” prompt students to examine core principles of sustainable farming and ecotourism by close reading of their text and listening to a speaker. Students had visited a sustainable coffee farm and lived as an ecotourist for over a week at this point in the trip.
**Figure 5.** The thinking routine “Circle of Viewpoints” prompts students to consider a concept or experience from various viewpoints. In this example, reflecting on a national park from different perspectives required students to apply ecotourism principles discussed in previous class sessions and to consider the work of natural history scientists.

| I am thinking of Palo Verde from the viewpoint of a(n): | Ecotourist | Naturalist working at Palo Verde |
|-------------------------------------------------------|------------|---------------------------------|
| I think that ...                                       |            |                                 |
| (Take on the character of this viewpoint. What does this person think? What is their take? Why do they think this?) |            |                                 |
| A question I have from this viewpoint is ...           |            |                                 |
| (What might this person be curious or puzzled about?)  |            |                                 |

**Figure 6.** The thinking routine “Step Inside” assesses students’ ability to apply previously learned knowledge to a novel situation by examining it from a unique perspective. In this example, student responses revealed their proficiency in applying conservation and sustainability concepts as they described a beach or estuary from their chosen viewpoint. Student responses included fish affected by plastics in water, white-faced capuchins fed by tourists, beach-dwelling crabs impacted by humans, and changes in sand due to pollution.
Fill in the blanks below with adjectives and terms that describe environmental problems described in the reading. Add more circles to the graphic if you want.

As we travel today, I may ask you to explain to the other students in our group some of the key points related to energy production in Costa Rica. Use the space below to identify key elements from the readings that you can use in your explanations.

Use the graphic below to capture the main elements of the text from Chapter 5. Write key points in the blanks on the left and supporting elements in the sections on the right.

Use your senses to observe and describe Palo Verde. How does it compare to Monteverde, UGACR, or La Selva? Complete the following Venn diagram to compare and contrast these different forests.

Figure 7. Examples of graphic organizers used in the guided journaling worksheets.
challenges associated with teaching a short-term study abroad course. The examples provided here are meant to encourage faculty to consider course-specific applications of GJWs to enhance and capture student learning in a variety of disciplines and educational structures.

Acknowledgments

I thank the many students who provided feedback on the GJWs. Also, thanks to John Niedźwiecki, my teaching colleague on the Costa Rica Study Abroad trip, and Lauren Lunsford for feedback on the manuscript.

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DARLENE PANVINI is a Professor in the Department of Biology at Belmont University, Nashville, TN 37212; e-mail: darlene.panvini@belmont.edu.