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PROFESSIONAL DEVELOPMENT EVALUATION

TELLING YOUR SCIENCE AS A STORY WORKSHOP

Prepared for the
American Society for Microbiology
Washington, DC

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SUMMARY AND RECOMMENDATIONS

The American Society for Microbiology (ASM) contracted Randi Korn & Associates, Inc. (RK&A) to evaluate participants' experiences in the "Telling Your Science as a Story" workshop (the workshop), which seeks to empower ASM members to develop more effective science communication skills. The purpose of the evaluation is to provide ASM with useful information about participants' experiences in the pilot workshops to inform future development of ASM's science communication programming.

The findings presented here are among the most salient. Please read the body of the report for a more comprehensive presentation of findings.

WORKSHOP ATTENDEES AND MOTIVATIONS

Workshop attendees varied greatly in their career level and results show that career variations had an effect on their motivations for attending. Those at an earlier stage (graduate students and postdocs) mostly chose to attend for career advancement purposes, such as improving their communication in job interviews, cover letters, and/or grant proposals. Those at an advanced point in their careers (professors/lecturers), on the other hand, hoped to learn ways to better "bridge the divide" between scientists and the public as well as techniques for teaching students how to become better science communicators.

POSITIVE ASPECTS OF THE WORKSHOP

Results show that overall the workshop was a positive experience for participants. Aspects of the workshop that contributed to their positive experience include gestures or activities that felt "personal," such as when the hosts shared their own experiences with science communication and the "memorable learning experience" icebreaker. These elements helped participants feel more comfortable working together and because they illustrate how including personal elements in a story creates a more engaging story, they reinforced a key message of the workshop. Working with a partner also contributed to a positive workshop experience. In particular, pairing participants with different sets of experiences and/or who are at different points in their careers allowed them to gain wide-ranging feedback on their communication skills, learn from others' experiences in science communication (who have struggled with similar issues), and network for future research and/or career advancement. Finally, the workshop provided concrete, useable tips for effective science communication, such as being "conscious" and "mindful" of the needs and experiences of different audiences and speaking clearly and concisely when communicating research.

CHALLENGING ASPECTS OF THE WORKSHOP

Participants named few challenging aspects of the workshop activities. However, results suggest that some participants may not have been as open to learning as would have been desirable. For example, while many participants admitted the general concept of telling their science “as a story” was new to them, a few (mostly professors) emphasized that it was something they “already know” to do. This suggests that ASM members at a more advanced stage in their career may not feel the workshop is appropriate for or relevant to them, and that it may be difficult to move them to a new place in their thinking about science communication (e.g., motivate them to try new techniques; convince them that this is a skill-set that needs to be constantly fine-tuned, regardless of age and/or career level, etc.). Additionally, results show that many continue to harbor fears about how to effectively communicate their science; for example, finding ways to make their research feel “relatable” without knowing anything about their audiences’ prior knowledge and experiences, and finding simple ways explain scientific jargon without “insulting” people’s intelligence. These kinds of fears are to be expected, since developing strong science communication skills is an ongoing endeavor.

BARRIERS TO COMMUNICATING SCIENCE TO NON-SCIENTISTS

Notably, even though the workshop introduced participants to effective strategies for communicating science to the public, results suggest that there was misunderstanding among some participants about what was meant by “science communication.” For example, a few originally understood the term to mean “communicating science to people who already have a level of understanding of science,” and thus expected the workshop to focus solely on communication between scientists. They seemed surprised by the emphasis placed on lay audiences, and throughout the interviews, remained apathetic to the idea of communicating science with the public; perhaps, because they were only motivated to attend the workshop to learn techniques to help advance their own careers. Additionally, even participants who embraced the idea of communicating science with the public sometimes had trouble articulating the overall importance of doing so (i.e., they showed enthusiasm for the new techniques learned in the workshop for how to better convey their message[s] to non-scientists, but had trouble communicating why it is important to talk to non-scientists about science in the first place). These findings highlight the importance of defining terminology in promotional materials for the workshop as well as the challenge of working with a population that is used to working primarily in academia (i.e., among experts).

POST-WORKSHOP ACTIVITY

Results show that completion of the post-workshop activity was uneven among participants. Some implemented their communications plans after the workshop, and a few others said they implemented their plans without using the workshop techniques; and, notably, all but one said they did not follow up with their partner about the communication plans. Despite this, all were enthusiastic about further developing their science communication skills and said they are interested in participating in future science communication programming through ASM. All of this suggests that participants might benefit from a more guided post-workshop experience;

perhaps, at the very least, a follow-up via email from ASM about the progress of the communication plans.

RECOMMENDATIONS

- ◆ Clearly define “science communication” in all promotional materials so potential participants’ understand that the workshop will address techniques for communicating science to non-scientists and fellow scientists. Similarly, continue to reiterate what ASM means by “science communication” throughout the workshop so participants are cognizant of it during all activities. As a reinforcement activity, brainstorm potential audiences at the start of the workshop.
- ◆ Consider facilitating an in-depth discussion on the importance of communicating science to the public to a) help participants understand why communicating science to the public is a valuable endeavor and b) articulate the importance to others. While the current workshop briefly touches on these ideas (on the “four broad whys” slide—number 2, ‘we want to live in a science-literate world’), facilitating a deeper discussion about this topic may help participants become more effective science communicators in both the public and academic spheres.
- ◆ Offer the workshop to all ASM members, regardless of experience/career level; participants (particularly those at earlier stages in their careers) appreciated the opportunity to network with and learn from those with a different set of experiences than their own. However, those at advanced stages in their careers (e.g., professors) may need to be convinced to attend the workshops as the relevance of them may not be obvious. To that end, consider asking seasoned professors who know the value of “science communication” to promote the workshop on behalf of ASM and even invite them to co-present the workshop with ASM staff.
- ◆ Add a workshop activity that asks participants to generate a list of “laymen’s terms” for common microbiology words to reduce scientific jargon and alleviate participants’ fears about how to communicate their science so it feels “relatable.”
- ◆ Remind participants about their communications plans after the workshop and include a short list of “tips and tricks for effective communication” discussed in the workshop.
- ◆ Offer additional science communication training for ASM members; for example, workshops (in-person or online) tailored to specific audiences and/or situations (e.g., grant reviewers, non-scientists, job interviews, conference presentations, etc.), “elevator pitch” practice sessions at ASM conferences, classroom materials for professors, and/or a science communication blog.

STUDY BACKGROUND

The American Society for Microbiology (ASM) contracted Randi Korn & Associates, Inc. (RK&A) to evaluate participants' experiences in the "Telling Your Science as a Story" workshop (the workshop), which seeks to empower ASM members to develop more effective science communication skills through hands-on activities, reflection, and discussion. At the time of the study, ASM had offered two half-day (3-hour) pilot workshops—one at the end of a Florida Branch (local chapter) meeting in October 2015, and one for Washington, D.C. Branch members in November 2015.

The purpose of the evaluation is to provide ASM with useful information about participants' experiences in the pilot workshops, including their successes and shortcomings within the context of the workshop goals, to inform future development of ASM's science communication programming.

Specifically, the objectives of the study were to explore:

- ◆ Participants' motivations for attending the workshop;
- ◆ What participants experienced as the most successful and most challenging aspects of the workshop (e.g., specific activities, ideas discussed, overall pace, etc.);
- ◆ Participants' thoughts about the partner work;
- ◆ The extent to which participants gain an understanding of the value of communicating science to the general public;
- ◆ The extent to which workshop participants have implemented the "communications plans" developed in the workshop;
- ◆ In what ways and to what extent the workshop helped participants feel motivated/inspired to further develop their science communication skills; and,
- ◆ What support and/or resources ASM could provide scientists that might help them continue to develop their science communication skills.

METHODOLOGY

RK&A conducted 12 in-depth telephone interviews with ASM members who participated in one of the two pilot workshops (in either Florida or Washington, D.C.). All interviews took place over the course of three weeks in November and December 2015 (about 3-6 weeks after the Washington, D.C. workshop and about 5-8 weeks after the Florida workshop). To provide context for the interviews, an RK&A evaluator observed the Washington, D.C. workshop in November 2015.

Interviewees were chosen from a list of participants provided by ASM. The introductory script and interview guide are included in Appendix A. All interviews were audio-recorded and transcribed to facilitate analysis. As a token of appreciation, all interviewees' names were entered in a raffle and one winner received a microbiology book, courtesy of ASM.

In-depth interviews are exploratory, producing detailed information about the nuances of participants' thoughts and opinions. Interviewees are encouraged and motivated to express their opinions and feelings and to share with the interviewer the meanings they associate with workshop activities.

DATA ANALYSIS AND REPORTING METHOD

The data are qualitative, meaning that results are descriptive. In analyzing the data, the evaluator studied the transcripts and notes for meaningful patterns and, as patterns and trends emerged, grouped similar responses. The objectives of the study as well as our professional experience informed the analysis. Trends and themes in the data are presented from most- to least-frequently occurring.

Findings are reported in narrative and illustrated with exemplary quotations. Verbatim quotations from interviews (edited for clarity) illustrate interviewees' thoughts and ideas as fully as possible. The interviewer's questions appear in parentheses.

INTERVIEW FINDINGS

In November and December 2015, RK&A interviewed 12 participants via telephone about their experiences in the “Telling Your Science as a Story” workshop. Participants include graduate students, postdoctoral fellows (postdocs), and professors who attended a pilot workshop in Fall 2015. Though the data were examined collectively, distinct trends that emerged among these groups are noted when appropriate. Of the 34 individuals contacted about an interview, 12 agreed to participate, for a participation rate of 35 percent.

Of the individual participants:

- ◆ Two-thirds attended the Florida workshop, and one-third attended the Washington, D.C. workshop.
- ◆ More than one-half are female.
- ◆ In terms of career level:
 - One-third are graduate students;
 - One-third are postdocs; and
 - One-third are professors and/or lecturers.

MOTIVATION TO ATTEND

Participants named a few reasons why they were motivated to attend the workshop:

- ◆ **Career advancement:** Slightly more than one-half (all graduate students or postdocs) said they attended the workshop to learn tips and tricks for better science communication that might help them secure a job and/or benefit their career in some other way (e.g., by writing a successful grant proposal). In particular, these participants said they were interested to learn simple and effective ways to communicate their research and interests in cover letters (writing) as well as in interviews (in-person).
- ◆ **Public communication:** Two said they hoped to learn effective methods for communicating science to the “average” person (non-scientists) because they have struggled to “bridge the divide” between scientists and lay people in the past. One professor, for example, hoped to improve her public communication skills because she frequently discusses microbiology research with the media.
- ◆ **Helping students:** Two professors, on the other hand, were primarily motivated to attend by the prospect of helping students improve their science communication skills. These participants were less concerned with improving their own skill set, such as one who described her role as both “a participant, yet observer at the same time.”
- ◆ **Required to attend:** One graduate student simply said she attended the workshop because it was required by her supervisor.

SUCCESSFUL ASPECTS

Overall, participants spoke very positively about the workshop, calling it “fun” and “interesting.” When asked about their overall takeaways, participants said the workshop conveyed the importance of:

- ◆ **Clear and concise communication:** Most said the workshop emphasized the need to speak clearly and concisely when communicating their research. Some said they learned about (or were reminded of) the importance of being concise and preparing the “main points” ahead of time; for example, when sharing their “elevator pitch” in only 30 seconds and in the “inverted pyramid” discussion.
- ◆ **Audience awareness:** Some said the workshop reinforced the importance of being “conscious” and “mindful” that different audiences (whether scientists or laypeople) bring a variety of experiences and prior knowledge to the table. Participants cited several examples of workshop activities that conveyed this idea; namely, repeatedly practicing their “elevator pitch” while pretending their partner is a colleague from the English department and the “dropping the jargon” exercise.
- ◆ **Storytelling:** A few spoke more broadly about storytelling, such as one participant who said though she always attempts to tell her “science as a story,” the workshop helped her realize that there are many different ways to do so effectively.

BIG TAKEAWAY: SIMPLICITY IS KEY

“ I [gained] a better understanding of how to communicate what I do in a simplistic fashion. When I did [the elevator pitch exercise] the first time I was cramming [in] all of this stuff and it was very difficult. [But] then they had a brief presentation about some of the strategies you can use, and we tried it again, [pretending it was for] a history professor or an individual outside of the discipline, [which] made it more challenging. But, **it gave [me] some ideas [of] how to formulate [my] response [for someone] who is not in [my] field in a way that [they] could actually understand. So that was really good, because I never really thought about it. I normally just talk to people [using] big words and all that [stuff].** Coming away from the workshop, I think I have a better appreciation for how I communicate the information. ”

—Lecturer, DC workshop

Additionally, participants named a few other aspects of the workshop they felt worked well:

- ◆ **Interactivity:** A few said they appreciated the “interactive” nature of the workshop (i.e., working with partners) because it helped them better understand their strengths and weaknesses in communicating their research. As one participant put it, “you can think about what you want to say but when you actually say it out loud to another person, that’s when you realize if you’re able to do it effectively.” Related to this, two also said they liked the icebreaker activity (where participants shared a story about what inspired them to become scientists) because it made the workshop feel “personal” and helped them feel comfortable working with the other participants.
- ◆ **Welcoming hosts:** A few said the “friendly” and “approachable” hosts made them feel comfortable and relaxed, and they appreciated their overall enthusiasm for helping attendees improve their communication skills. In particular, they liked hearing hosts’ own personal stories, that they made a conscious effort to include everybody in group discussions, and their willingness to help participants’ work through personal struggles around communication. One DC participant, for example, said she appreciated that the hosts took her concerns about her heavy foreign accent seriously and continuously reminded her of techniques she could employ to be better understood.
- ◆ **Meeting new colleagues:** Two participants said they liked that the workshop provided an opportunity to network with colleagues across different areas of microbiology.

POSITIVE ASPECT: ICEBREAKER ACTIVITY

“One thing that I really liked as an icebreaker [was when the host] had everyone go around the room and [talk] about why [they] got into science. It kind of morphed, like a game of telephone. By the time you got to the last person it changed, like what people were describing, which was interesting in itself. But I thought it was **a nice icebreaker to get people to start to feel comfortable with each other.** They [all] shared something personal with the group.”

—Professor, FL workshop

CHALLENGING ASPECTS

When asked what was challenging about the workshop, some participants named specific workshop activities they found difficult while others shared broader concerns related to becoming an effective communicator.

- ◆ **Challenge of making things “relatable”:** One-half said they were concerned about finding ways to make their research feel “relatable” to their audience (particularly lay audiences, but also scientists outside of their discipline). Overall, their concern was rooted in the fact that it is often difficult and/or impossible to know or understand your audiences’ prior knowledge or experiences. They worried about insulting people’s intelligence and striking the “correct” balance between detail and big ideas in future communication efforts.
- ◆ **“Tap a song” difficult for foreigners:** Two said the “tap a song” exercise was difficult for foreign-born participants because they did not recognize (and thus were unable to tap) most of the suggested songs; one also felt this might be a problem beyond the pilot workshops, since many science researchers in the United States are foreign-born.
- ◆ **Working with strangers is nerve-wracking:** Two said they were apprehensive about working with partners they had never met because they are naturally shy.
- ◆ **Difficulty reducing jargon:** One participant spoke at length about the challenge of reducing the scientific jargon from her “miniature message” (three key points); for example, clearly explaining the term “soil providence” (origin of soil) in way that non-scientists can understand (e.g., “where the soil comes from”).
- ◆ **Icebreaker activity too long:** One said the icebreaker activity felt “drawn out,” and wished the hosts had imposed a time limit and/or solicited stories from just a few participants rather than the entire group.

CHALLENGE: MAKING THINGS RELATABLE

“ The two-minute and thirty-second pitches were challenging. **While I was doing [them] I was wondering what information is relevant—what exactly should I tell this person?** Why should this individual even care, and how could I formulate in such a way [so] that this person, who is not in my discipline, who has no idea, [can] understand? How do I do that? So that was pretty challenging. ”

—Lecturer, DC workshop

WORKING WITH A PARTNER

Overall, participants spoke very positively about their experiences working with a partner in the workshop. In particular, a few said they liked working with strangers because it helped them “focus,” made them take the exercises “more seriously,” and allowed them to receive “unbiased” feedback on their elevator pitches.

All participants said they liked being paired with someone with a different set of experiences and/or who is at a different point in his or her career. Some (mostly postdocs and professors) liked the chance to learn about others’ research, compare protocols, and explore potential future collaborations. Some graduate students, on the other hand, were excited to hear how professors secured their positions and to learn about their experiences communicating science throughout their careers. One graduate student (who attended the Florida workshop) also said seeing her advisor attend the workshop along with her students “put her at ease” because it helped her understand that “there’s always room for improvement no matter where you stand”; that is, that effective science communication is not something she will “just get,” but rather a skill-set she will have to “fine-tune” over time.

However, despite their overall positive impression of the partner work, a few participants said working with the same partner throughout the workshop felt “repetitive.” They suggested rotating partners throughout the workshop so participants can receive “more suggestions about how to improve [their] stories.”

APPRECIATION FOR THE RANGE OF CAREER LEVELS

“ There was quite a mix of individuals from different parts of their career taking this workshop. So that kind of put me at ease that this is not exactly an easy thing to do. I think because you spend so many hours in [the] office and talking and networking with the same type of people, there’s a disconnect with just talking in general about [science] in a way that can be understood without needing too much background information. **I see [my advisor] do tours of the lab all the time, and I’m always amazed at how well she can break things down and speak. But the fact that she took the workshop tells me that you can always improve. You’re never at a spot where you’re like ‘Oh, I got this.’ There’s always room for improvement no matter where you stand.** It’s an ongoing thing to constantly work [on]. And that put me at ease, because it made me realize that this isn’t something I’m just going to get. This is something I’m going to have to fine-tune over time. And even over time I might need refreshers. That was a positive for me.”

—Graduate student, FL workshop

COMMUNICATING SCIENCE TO THE PUBLIC

Participants were also asked to discuss how, if at all, the workshop affected their thoughts on communicating science to the public (i.e., non-scientists). Their responses fell into two categories, outlined below:

- ◆ **Public science communication is important:** Most participants demonstrated an understanding that communicating science to the public is a valuable endeavor, though the manner in which they conveyed this understanding differed among participant groups.
 - A few (all professors and/or lecturers), explicitly stated that the workshop reinforced that communicating science to the public is worthwhile. However, the extent to which they admitted having thought about this before the workshop varied; one, for example, admitted that the focus on the public was relatively new to him (having spent most of his career in the lab), but another referenced her work with the media as an example of her commitment to generating public interest in and engagement with science.
 - On the other hand, a few participants (all graduate students or postdocs) had trouble articulating why it is important to communicate science to the public, but nevertheless implicitly conveyed an understanding that it is important to do so. That is, when probed, they primarily discussed methods for communicating science to the general public that they learned in the workshop as opposed to the overall importance of doing so; for example, being “crisp” (concise), avoiding jargon, and focusing on big ideas rather than details.
- ◆ **Unconcerned with communicating science to the public:** When probed, a few participants seemed conflicted and/or discouraged about the prospect of communicating science to the public, and even seemed surprised by the workshop’s focus on lay audiences. Two, for instance, said they initially interpreted the term “science communication” to mean “communicating science to people who already have a level of understanding of science, not the person who has never opened a science book.”

EXPLAINING SCIENCE TO NON-SCIENTISTS

“ (Can you summarize how, if at all, the workshop affected your thoughts on communicating science to the general public?) **Be more engaged and really understand who you’re talking to before you communicate your science. I think that’s a huge key.** I try to make it a conversation, not like ‘I am the ultimate person of soil forensics and it’s good that you don’t understand me.’ No—you want them to understand you. Even if it’s a middle-schooler. So that’s what I got out of [the workshop]. Little tips and tricks and things you could do to verify [that you are being clear]. ”

—Graduate student, FL workshop

POST-WORKSHOP ACTIVITY

Participants were also asked about their experiences after the workshop, including the extent to which they have implemented the “communication plans”¹ developed in the workshop as well as their overall motivation to further develop their science communication skills.

COMMUNICATION PLANS

The majority of participants said they implemented their communication plans after the workshop; a few had not because the event where they planned to do so had not yet occurred. Those who did implement their plans described different degrees of effort to incorporate techniques from the workshop:

- ◆ A few said they made a conscious effort to practice strategies discussed in the workshop and utilize them when implementing their plans, such as one professor who practiced stating the “main points” she hoped to convey in an interview with the media in under thirty seconds, and a graduate student who tried to eliminate jargon (like the phrase “bio-geochemical cycles”) when explaining her research to her nephew over Thanksgiving.
- ◆ A few others said they effectively “had to” implement their plans because they were obligated to attend a conference or a family event where they knew they would be asked about their work, but did not make a conscious effort to incorporate communication strategies from the workshop. One postdoc, for example, said he spoke to colleagues at a conference about his work but did so “out of instinct as opposed to satisfying the requirements of the workshop.”
- ◆ One participant described an “unsuccessful” attempt to implement her plan—receiving “deer in the headlights” looks after using her “elevator pitch” with new acquaintances at a family party, which made her realize that she still needs to “work on breaking it down to an understandable level.”

Notably, all but one participant said they have not followed up with their partners. Slightly more than one-half said this was because they had either not yet implemented their own plans or because they knew their partner had not done so. However, the remaining participants said they had not followed up because they “forgot,” were “lazy,” and/or were “too busy” with other work. Along these lines, one also said she expected the workshop hosts to reach out and remind participants about the plans and about following up with their partners.

¹ For the “communications plans,” participants pledged to communicate their science in two different settings in the three months following the workshop. More specifically, for each setting they articulated a) the message they wanted to communicate, b) their audience, and c) their goals. They also exchanged email addresses with their workshop partner so they could follow-up with them about implementing the plans.

MOTIVATION TO FURTHER DEVELOP COMMUNICATION SKILLS

Almost all participants said the workshop inspired them to further develop their science communication skills and that it made them more “conscious” and “aware” of the importance of being an effective communicator. However, many were unable to point out concrete steps they’ve taken to further develop these skills since the workshop. Instead, they simply shared a range of skills and/or communication situations in which they hope to improve; for example, explaining their work to non-scientists more effectively (particularly to family members), perfecting their “elevator pitches,” and reducing jargon in grant proposals to make them more accessible to reviewers from other science sub-disciplines.

On the other hand, a few shared steps they have taken since the workshop to become better communicators (or help others do so). One participant, for example, said she visited many of the websites recommended in the workshop to learn more techniques for reducing jargon, while another said he was “so inspired” by the workshop that he volunteered to attend a conference for minorities in science so he could share what he had learned with undergraduate students.

DESIRE TO BUILD COMMUNICATION SKILLS

“ (How, if at all, did the workshop inspire you to further develop your science communication skills?) It’s important for my career. I need to interact with other people at work [and] also with people [at] funding agencies, especially the government. **I guess the workshop made me think about talking about my research with people that I meet who are not in science. Trying to go out of my way to tell friends, neighbors, random strangers what I do at work in a way that makes sense to them.** For example, my parents don’t really understand what I do. It’s helpful for me to try to explain and try to pick up on what part of science they don’t get.”

—Postdoc, DC workshop

FUTURE SUPPORT

When asked to describe what kind of support and/or resources ASM could provide to help them further develop their science communication skills, participants offered several ideas:

- ◆ **Continue offering in-person workshops:** Many said they hope ASM will continue to offer in-person workshops, preferably for free (which they said is especially helpful for students) and possibly at national ASM conferences. Two also proposed ASM offer workshops that focus on communicating science in particular settings, such as in the classroom, with potential employers, or with funding agencies, since the “Telling Your Science as a Story” workshop is more “general” (i.e., targets a variety of audiences).
- ◆ **Provide online resources:** A few suggested ASM disseminate science communication resources via a range of online methods; for example, an online version of the workshop (i.e., interactive webinar), a blog with helpful tips and tricks of the trade (such as suggestions of simple ways to explain common microbiology terms and reduce jargon), videos showing examples of great “elevator pitches,” and a science-communication themed podcast. One of these participants also suggested ASM distribute the workshop slides to professors and other educators so they can use them to teach their students about effective science communication.
- ◆ **Convene elevator pitch “practice sessions”:** One suggested ASM arrange “practice your elevator pitch” sessions at its conferences, where members could practice their 30-second pitch and receive feedback from other members.
- ◆ **Host mixers:** One participant suggested ASM host “mixers” or “local microbiology cocktail hours” to provide ASM members with more “natural” and casual opportunities to practice communicating their science with one another.
- ◆ **Facilitate post-workshop follow-up sessions:** Another participant suggested ASM do more to follow-up with participants after the workshop; for instance, via group Skype chats to check-in about communication plans and discuss ongoing concerns related to science communication.

APPENDICES

APPENDIX A: INTRODUCTORY SCRIPT AND INTERVIEW GUIDE

Removed for proprietary purposes.