

The Assertion-Evidence Approach to Technical Presentations: Overcoming Resistance in Professional Settings

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Summary

The assertion-evidence (AE) approach to presentations is a non-traditional way [1-4] for engineers and scientists to share their work with their audiences. In short, the approach calls on presenters to build each talk on messages (not topic phrases), to support those messages with visual evidence (not bullet lists), and to explain that evidence by fashioning sentences on the spot (but only after planning and practice). Research shows that presentations with the AE approach lead to deeper understanding of the content not only by the audience [5-7], but also by the speaker [8]. Given its advantages, the AE approach is being increasingly introduced to college students through communications courses and organizations such as the Engineering Ambassadors Network [9-10].

This paper is an exploratory study on the experiences of students presenting in post-graduate settings after learning the AE approach. In order to gage the resistance to and potential of the AE approach in such settings, we surveyed thirty college students and young professionals, asking questions in a fashion that encouraged the interviewees to volunteer information. These surveys, which followed the customer discovery approach used in lean design [11], were then analyzed to understand how AE is received outside of the classroom.

Participants in the survey showed that once they learned the AE style, they preferred to use it for presentations in industry and research. Since the style is not widespread, though, participants described facing resistance from superiors and peers because of uncertainty about the style and opposition to deviating from company standards and traditional methods. Defying this resistance, many participants who attempted to incorporate elements of the AE style found that they had great success with those who were initially opposed, as well as with almost all of their overall audiences. With most engineers and scientists looking for ways to improve their presentations, participants expressed beliefs that great potential exists for the AE approach to be spread to professional settings through individuals giving AE talks in those settings and through online resources.

Introduction

In science and engineering, presentations are key to sharing knowledge and ideas with others. Currently, the common practice for technical presentations entails titling slides with phrases and supporting those phrase headlines with bulleted lists. An alternative method is the assertion-evidence (AE) approach to presentations [1-4]. The AE style emphasizes the following three principles: (1) focusing a presentation on messages instead of topics; (2) providing visual evidence for those messages instead of bulleted lists; and (3) forming sentences on the spot instead of reading from slides. These three principles are in line with the general approaches of other researchers who are challenging PowerPoint's defaults: Nancy Duarte [12] and Garr Reynolds [13]

from TED, Steve Kosslyn [14] from neuroscience, and Richard E. Mayer [15] from multimedia learning. According to recent research [5-7], the AE approach, when compared with the traditional approach, leads to better comprehension of the content by audiences. Research also shows that the speakers themselves comprehend and retain their content more deeply when using the AE approach [8]. Because of the apparent advantages of the AE approach, institutions and organizations such as the Engineering Ambassadors Network [9-10] are teaching the approach to their students. Shown in Figure 1 are two slides that follow the assertion-evidence approach.

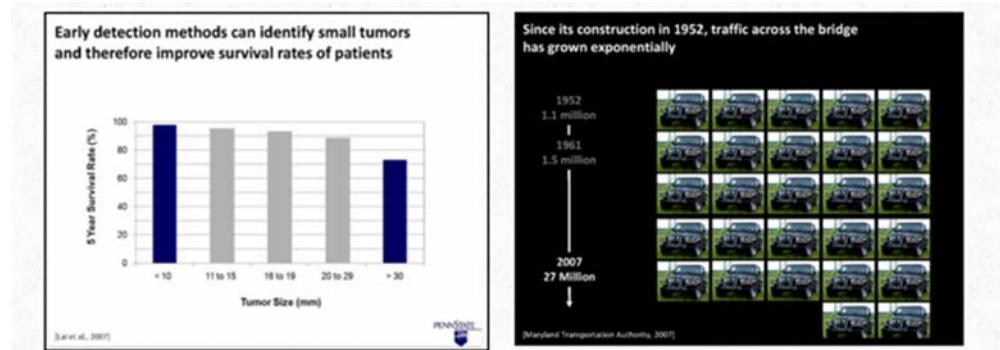


Figure 1: Two example slides that follow the assertion-evidence approach [4]. Note that the headlines are sentence assertions, as opposed to phrases. Note also that the bodies of the slides contain only visual evidence, not bullet lists.

Although the AE approach is spreading on a collegiate level [10], it is not yet widely used in professional settings. To explore how to spread the use of AE in professional settings, we conducted a study to determine how students who have learned the innovative method are giving presentations in their companies and laboratories. Drawing from that study, this paper focuses upon the experiences of undergraduates and graduates presenting in industry and research, specifically highlighting how students have utilized the AE approach in such settings. This paper analyzes the following three research questions:

- (1) Do students and recent graduates who learn the approach attempt to use it in professional settings?
- (2) How much resistance do those students and recent graduates face, and what are the underlying reasons for that resistance?
- (3) What strategies can students and recent graduates use to overcome that resistance?

Understanding the experiences of students and recent graduates and identifying sources of resistance to the AE approach will help determine ways to spread the approach in order to improve future technical presentations.

Methods

In our research, thirty undergraduate and graduate students were selected for a survey about their experiences with technical presentations. The pool of participants consisted of seventeen with industry experience and thirteen with research experience. All had been exposed to the AE approach through Engineering Ambassadors as well as a university speaking course. The Engineering Ambassadors Network is a collaboration of professional development programs for

undergraduate engineering students with an outreach mission to middle and high schools [10]. Programs include Pennsylvania State University, Worcester Polytechnic Institute, Rensselaer Polytechnic Institute, the University of Connecticut, University of Illinois at Urbana-Champaign, Oregon State University, Tufts University, Union College, University of Nebraska, Geneva College, James Madison University, and Ohio University. The development mission of the Network is to enrich the communication and leadership skills of engineering undergraduates through academic programs. The outreach mission is to attract a diverse population of middle and high school students into engineering. In short, the Engineering Ambassador Network places the right messenger (engineering undergraduates with advanced presentation skills) with the right message (messages about engineering from *Changing the Conversation* [16]) in front of middle and high school students.

Following the guidelines for customer-discovery interviews outlined in lean design [11], in the popular book *The Mom Test* [17], and in NSF Innovation-Corps workshops for spreading educational innovations [18], neutral questions were asked about the participants' histories of presenting in their internships, industry jobs, or graduate research laboratories. Participants described the nature of their presentations, including setting, style, and format, as well as the success of their presentations with their audiences. If participants revealed that they used the AE approach, they were asked to describe any resistance that they faced. Follow-up questions inquired about other presentation styles that participants observed from peers and superiors and thoughts that participants had about spreading the AE approach to industry and graduate research. The full question tree for the survey can be found in Appendix A and a sample survey can be found in Appendix B.

Because the sample size of this exploratory study was small, we did not attempt to measure for any statistical significance. Instead, we sought solely to gather responses to our three research questions to determine whether we should pursue a larger and more formal study.

Results: Students Using Assertion-Evidence Style in Professional Settings

As demonstrated by the survey, a number of contexts in industry and research require presentations. Out of the seventeen participants who discussed working in industry, fifteen reported giving and witnessing presentations, while two reported only witnessing presentations. Of the participants who presented, eight described giving major presentations to report on projects, two described giving minor presentations to teach workshops, report on progress, or acquire support for new projects, and five described giving both major and minor presentations. In research, twelve out of thirteen participants gave presentations and one witnessed presentations. All participants who presented described giving major presentations at conferences, and two also described giving more casual updates to their research teams periodically. See Figure 2 for the breakdown of the participant pool.

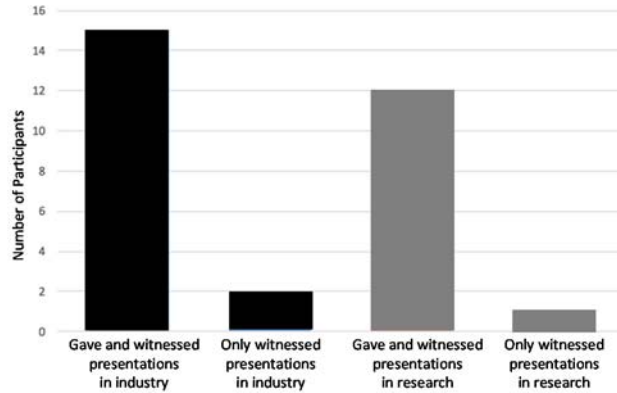


Figure 2: The distribution of participants' experiences with presentations.

All thirty student and graduate participants in the study were well-versed in the AE approach, and twenty-four out of the twenty-seven participants who gave presentations reported that their first instincts were to use AE. One participant with experience in the automotive industry did not create an AE presentation due to time constraints, while another participant in computer science explained that her presentation had to consist entirely of code. A third participant in research felt that a different style better suited her goals. The rest of the participants at least attempted to use AE, but whether they fully implemented the style depended on expectations that they received about format and resistance that they faced from superiors.

Participants reported using varying degrees of AE relative to requirements and resistance. All twelve researchers reported receiving little to no formatting requirements and used AE in full for all presentations, as did five participants from industry. On the opposite end of the spectrum, two participants from industry reported receiving strict presentation guidelines that they were expected to follow and were unable to use AE at all. Striking a balance between AE and the traditional method, one used a variation of AE for the presentation. The rest of the participants from industry gave multiple presentations and reported using different levels of AE for each. See Figure 3 to see how often AE was reportedly used in industry.

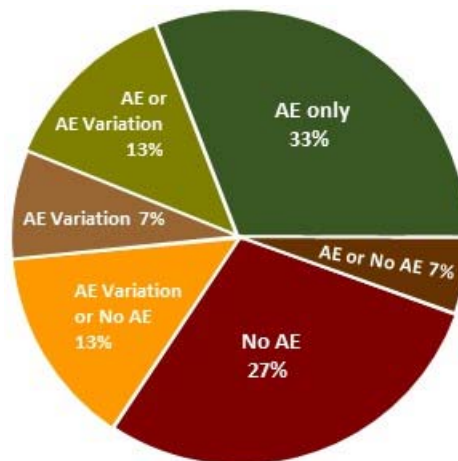


Figure 3: Percentages of the fifteen participants who used AE, a variation of it, or other styles in industry presentations. A number of participants had some of their talks in one of these three categories and other talks in another category.

Results: Resistance to Assertion-Evidence Style

When participants carried the AE style into professional settings, they received mixed reactions from those who were unfamiliar with it. Some superiors were eager to see the approach in action, some were open-minded but dubious about AE's effectiveness, and others were staunchly against the deviation from traditional formatting. Surveys showed that resistance varied, but almost always surfaced to some degree from managers, bosses, lab heads, coworkers, and peers. Although such resistance to the assertion-evidence approach is expected from a general diffusion of innovations perspective [19] and has been discussed in other sources [3-4, 20-22], this study is the first that has tried to document its extent.

Resistance in Industry. According to participant surveys about industry experiences, the AE approach was met with both willingness from superiors to try new methods and unwillingness to deviate from tradition. In low stake situations like intern final reports or daily updates, managers were often willing to give free reign with slide design. As shown in Figure 4, about 60 percent of participants in industry observed at least some resistance by managers to AE. Participants attribute this resistance to the managers' unfamiliarity with this method. However, some participants remarked that once managers saw the AE style, they appreciated how the presentations flowed and how polished the slides looked. Still, other participants reported that some managers never gave them the chance to demonstrate this method.

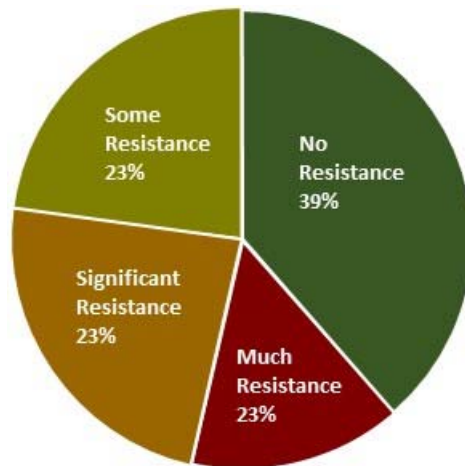


Figure 4: Distribution of levels of resistance to AE in industry.

Resistance in industry was frequently observed to be rooted in company expectations. In seven cases, participants were given premade templates with instructions about slide content. Because some of their managers expected them to follow the defined rules for presentations, the AE style was discouraged. More commonly, though, managers and bosses wanted all information to be written on the presentation slides for displaying in conferences or for documentation purposes. According to a participant with experience in the finance industry, she was not allowed to use AE because she had to give her presentation over Skype and her boss "wanted the information to be laid out right in front of everyone." Another participant with experience in the aerospace industry explained that she could not use AE because her company "liked to use PowerPoints as reference documents." According to six participants with industry experience, their

superiors wanted the presentations to be standalone so that they could be saved for future reference or shared with people not in attendance of the presentation.

Resistance in Research Laboratories. In graduate laboratories, because there seemed to often be less structure in terms of presentation requirements, graduate students reported having freedom that enabled the AE style. According to the surveys, advisors were receptive of the AE style because they felt that it “told a good story” and was “easy to follow.” Being unique, the AE style satisfied one advisor’s quest for a way to make presentations more exciting. As Figure 5 reflects, though, resistance was faced when two advisors wished to see more information and data on slides and expressed skepticism of the sentence assertion. One graduate researcher reported that his advisor was open to the approach, but wanted to ensure that the visual evidence was very high quality. Once participants presented with AE, though, they said that their resistant superiors discovered the benefits and effectiveness of the style.

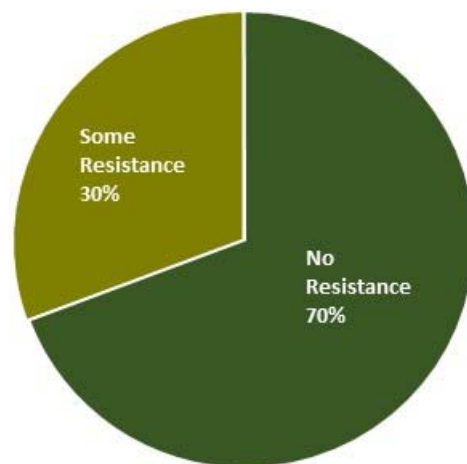


Figure 5: Distribution of levels of resistance to AE in research.

Discussion: Strategies to Overcome Resistance

Participants in the study found that when they effectively demonstrated the AE method, their audiences were very engaged and often gave preference to the AE presentations over others. Our survey shows that most professional presentations still follow the classic PowerPoint approach that primarily utilizes text; however, a common perception is that individuals and companies would be interested in learning the AE approach in order to improve their communication skills.

Predicted Future of AE. In the survey, twenty-eight participants pointed out that AE is not widely used in research or industry. They characterized presentations from peers and superiors as “text-heavy,” describing slides with many bullets as occurring in the traditional presentation method. According to nineteen participants, their co-interns and coworkers crammed lots of information on their slides, and one reported that some presenters simply read off their lists of bullets. Based on their observations, the majority of participants believed that a need exists for AE to be taught and that companies would be open to it.

Citing poor presentation skills of others as well as their own successes with using the AE approach, twenty-seven participants expressed that they think it would be beneficial to spread AE

to companies and research labs. They believe that AE would improve presentations by making them more engaging, more effective, and easier to understand and follow. Based on their experience in the aerospace and automotive industries, five participants did express that they thought AE might not be the best method for presentations with great technical depth; however, they still thought that AE would be better than the traditional method in more general contexts.

When considering spreading AE, thirteen participants expressed the opinion that people, especially in the millennial generation, would be very willing to learn how to give better presentations. As one graduate researcher stated in support of spreading AE, “people are always looking for ways to improve.” However, others cautioned that it would be difficult to change the ways of older people or to modify standards that have been in place for years. That being said, twenty-four participants still hypothesized that ways exist to share AE and to encourage people to start using it.

Ways to Spread AE. While most participants agreed that AE should be spread, several different opinions arose about how overcoming resistance and spreading it should be accomplished. Over half argued that AE needs to be more widely taught at colleges and then introduced to companies and labs through interns and new employees. In support of this argument, participants suggested that the younger generation is more open-minded and that they can phase it into their companies or research labs as they move up in status and replace the older generation. In the opinion of three participants, older employees would not be swayed by those at entry-level and that AE instead needs to be spread from the top down. They suggested that a superior would have to lead by example by using AE in a large presentation or that expectations would have to be explicitly redefined to require the use of AE. Other suggestions included spreading AE through lunch and learns, training workshops, or online resources.

Despite these different ideas, eighteen participants expressed the importance of showing the effectiveness of AE in order to help people fully grasp why they should adopt it. In two surveys, participants suggested demonstrating the traditional and AE methods side by side to compare and contrast them. Additionally, three emphasized the importance of sharing the research that supports how effective AE is with audiences. Participants acknowledged that resistance will exist, but expressed confidence that it can be overcome. As a participant from the science and technology industry expressed, “Once you see someone present with assertion-evidence, you realize what a powerful method it is.”

Assertion-Evidence Website. As mentioned, online resources were suggested by four participants for spreading AE, and one such resource already exists: www.assertion-evidence.com [4]. This website, which is the top Google listing for the search term *engineering presentations*, describes the AE approach and shares research and testimonials that support its effectiveness. Screen captures of this website appear in Figure 6. To help spread AE, the website contains special templates to allow users to bypass PowerPoint’s defaults, which lead users to create topic-subtopic slides, and to create AE slides that have a professional appearance. Included within these templates are model AE slides. In addition, the website contains films of students using the AE approach in model presentations. In effect, this website is designed to help visitors understand and adopt the AE approach. For that reason, current users of the AE approach in industry and research can recommend the site to their colleagues and supervisors. In our surveys, current AE users suggested that the website include the research foundation behind the approach, side-by-side comparisons of AE slides with typical slides, and AE templates for different occasions.

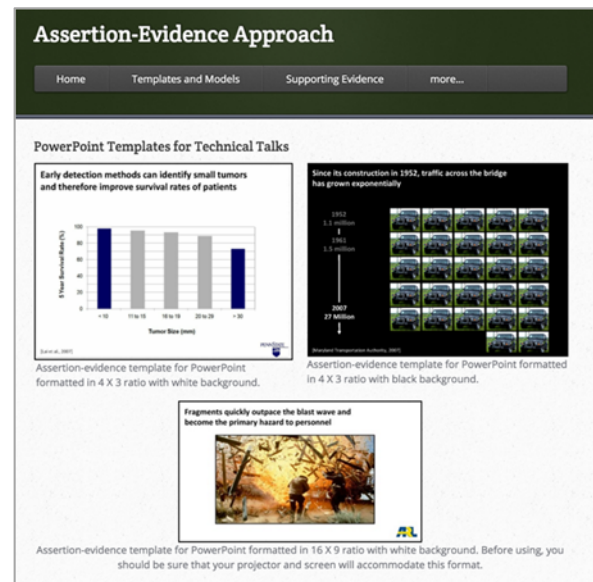
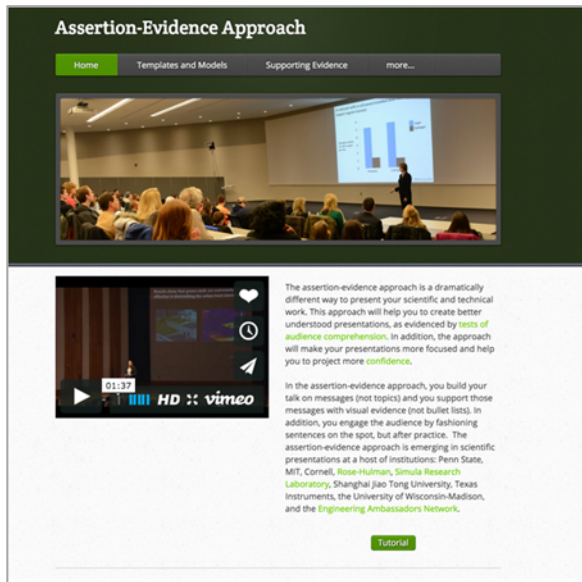


Figure 6: Homepage for assertion-evidence website and available templates [4].

Conclusions

As responses to our survey showed, the AE approach is not typically seen in professional presentations, but it could have a future there. Nearly all participants attempted to use it to some degree and held the belief that AE talks are more valuable than the traditional approach of having a phrase headline supported by a bullet list. While our surveys revealed that resistance to the AE style is stronger when an individual is unfamiliar with it, the level of resistance varies greatly. In addition, the resistance can often be overcome if the individuals witness an assertion-evidence talk. On a positive note, our survey participants showed much interest in helping to come up with ways to spread the approach so that more people can benefit from it.

Moving forward, we intend to try several suggestions given by our survey participants and to monitor the effect of those suggestions through additional surveys and traffic to the corresponding page on www.assertion-evidence.com. To branch off in a new direction, we should survey leaders in industry and research to understand their perspectives on professional presentations. Likewise, we should survey engineering faculty to discover how AE can be incorporated into engineering curriculum. Additional surveys of students and recent graduates should also be conducted in order to measure for statistically significant differences and to gain an even better understanding of experiences using AE in professional settings, the resistance the approach elicits, and new ways to spread the approach.

Appendix A: Survey Question Tree

Two question trees shown Figures A-1 and A-2 were developed to conduct surveys in a neutral manner so that respondents volunteered information, as opposed to providing answers that the respondents sensed were wanted. Depending on a participant's experience with giving presentations, one of the trees was followed and notes were recorded.

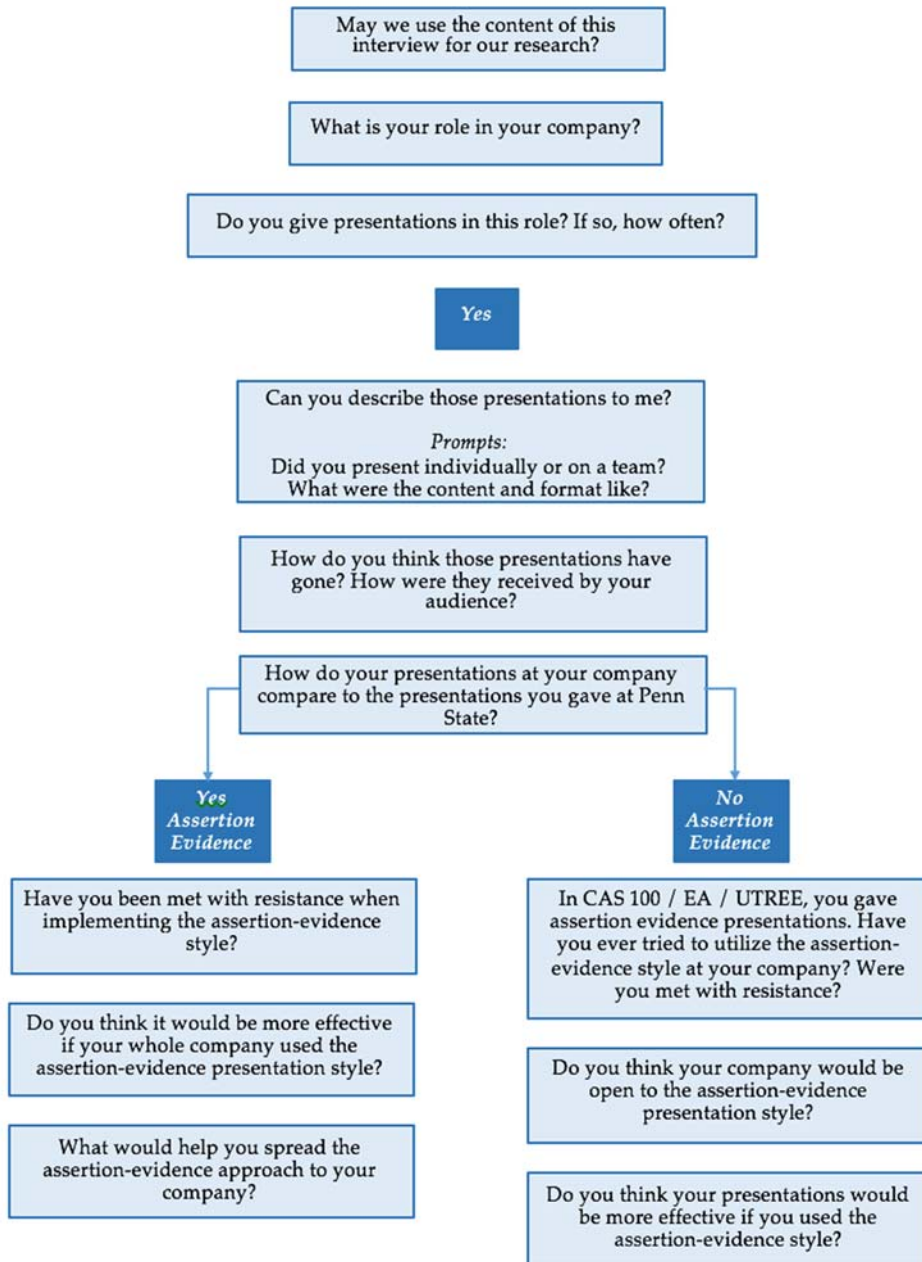


Figure A-1: Question tree for respondents who had experience giving professional presentations.

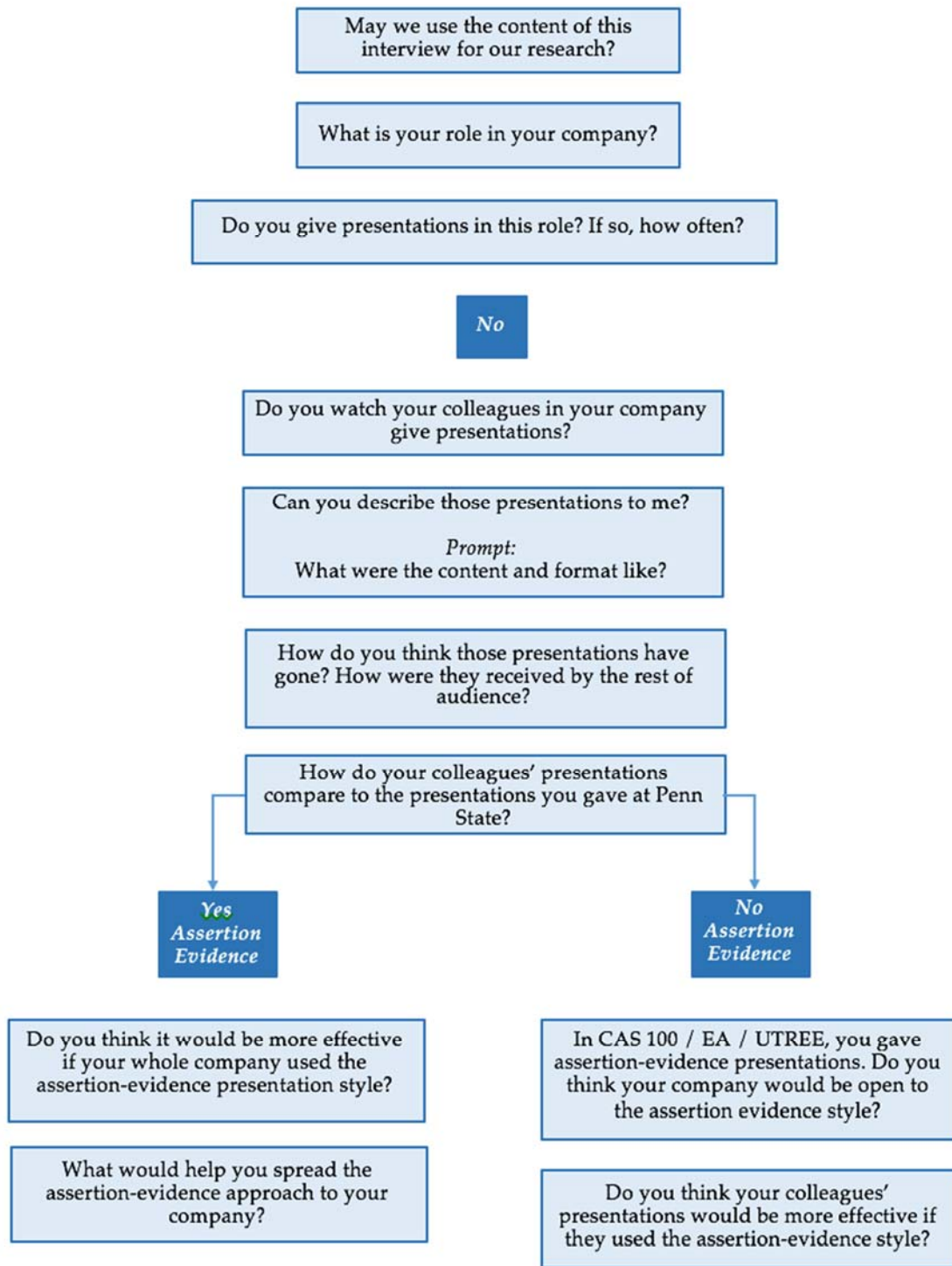


Figure A-2: Question tree for respondents who did not yet have experience giving professional presentations.

Appendix B: Summary of Sample Survey

Participant: Name of Participant

Engineering Ambassador: Undergraduate in Mechanical Engineering

What We Know: Participant is a student at _____ studying mechanical engineering. She is an Engineering Ambassador, and she had an internship in the aerospace industry.

What We Learned: During her time at the aerospace company, the participant gave a few presentations, including reports of her progress at morning meetings and one final report. She tried to use the assertion-evidence approach for her progress updates, but her manager was very opposed to it and said no. For her final project presentation, the participant actually created three different versions of her presentation for her manager to view in another attempt to use assertion-evidence—the first version was purely assertion-evidence, the second was a traditional bulleted PowerPoint, and the third was a mix of the two. She was ultimately allowed to use the mixed version, and it was well-received—she thought that more people paid attention to her presentation as opposed to the presentations of her peers.

She said that her manager was resistant toward assertion-evidence because people in her branch liked to use PowerPoints as reference documents. The company standard was a classic PowerPoint, and the participant observed some people putting entire paragraphs on their slides.

She believes it would be beneficial to bring assertion-evidence into industry. To address the reference document issue, she thinks that people can write extra information in the Notes section, although she does not think presentations should even be about archiving. She said that people do not like change, so it will take a long time to shift to assertion-evidence. She thinks that a person in a position of power would have to say, “We’re using this format now” since no one will want to listen to interns preaching the approach. Right now, in her opinion, the best way to spread it is through seminars.

What We Intend to Do Now: Encourage people to utilize the Notes section in their PowerPoints. Plan more seminars at companies to teach the assertion-evidence approach.

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