

I Conducted A Delphi Study

“(And Why You Should Too!)”

I have talked before about my experience thus far while working on my PhD (I’m enrolled in a doctoral program; Computer and Information Science at the University of Arkansas at Little Rock - UALR). PhD programs, while expensive, offer a wealth of opportunities to learn in a research-driven environment. My experience has been no different.

I have a separate website where I am cataloging the development of my PhD prototype (a domain-specific language used for analysis in energy markets) - [MerlinLang](#) - so I don’t want to rehash the details of it here. However, one of the components of this project deserves some more attention; I conducted a Delphi study (and you should, too!). It has been an eye-opening experience for me as a method of gathering information. I had never heard of this technique before I embarked on my research journey. I’m hopeful that this exposes anyone that takes the time to read this to a new idea.



*(What’s left of) The Temple of Apollo at Delphi -
where the Delphi Technique gets its namesake*

What is a Delphi study?

A Delphi study (sometimes referred to as “The Delphi Technique”) is a methodology for gathering opinion and sentiment from a panel of experts. As I understand it, this technique was materialized by the RAND Corporation during World War II. RAND utilized an expert-panel structure to help make strategy decisions for warfare¹.

¹ A simplified version of this can be seen in a real-story about locating a lost Cold War-era submarine in the biographical novel *Blind Man’s Bluff* (Drew, Drew, and Sontag). Military personnel formed a committee

Generally speaking, expert opinion does have legitimate bearing on the current state of a given field of expertise (I mean, why else use the term “expert”, right?). Delphi studies take advantage of this “critical mass” of qualified individuals and analyze the gathered information to do one of several options:

- Develop policy
- Craft requirements (this is the means that I’m pursuing in my PhD)
- Forecast future conditions
- Determine strategy in scenarios that involve significant uncertainty (the original means for which the RAND Corporation developed the technique)

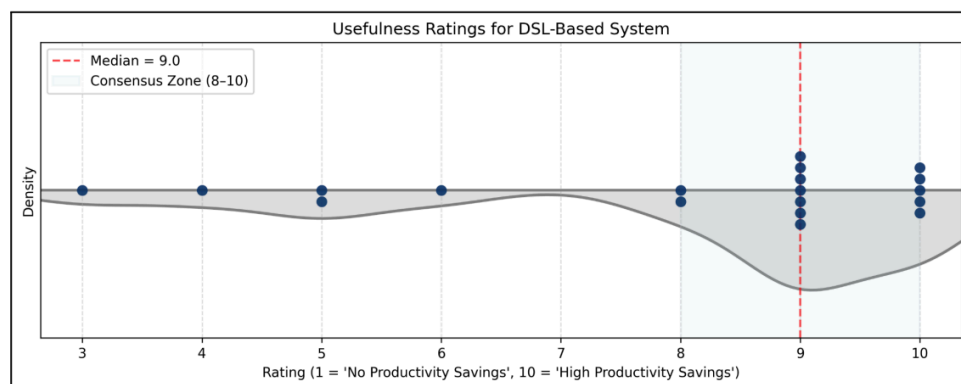
The Delphi technique, while implemented in a several varieties, follows a few key tenets:

The main “success metric” is achieving consensus among participants

Achieving consensus on a question is the golden standard of a Delphi study. Measuring consensus can take various forms, depending on how your questions are formulated (especially if you are asking questions that require the panelists to provide an anecdotal response).

An example that I can provide comes from the first round of the Delphi study that I conducted as part of my dissertation work. In the screenshot below, you’ll see that I visualized the responses in a swarm chart, with a kernel-density estimate (KDE) that helps to highlight the highest density of responses. The consensus zone can be seen in the uppermost quintile (shaded in light-green) from 8 - 10.

In the context of this particular question, I’m able to state that responders seem to believe that a DSL-based command system could be useful to their work. This is useful when embarking on a research study because it shows that a group of users agree that conducting the research has merit.



and voted on the conditions (using whiskey bottles) that they believed occurred that caused the loss of the submarine. Apparently, using the results of this study, they were able to locate the downed submarine.

Participants are Anonymous

Participants in Delphi-based studies tend to be anonymous (or at least pseudo-anonymous). If the panel is seated in the same physical location (where panelists would be able to identify other participants), the responses of the panelists are de-identified.

The reason for anonymity might seem confusing at first; why should experts hide their identity? As it happens- it is because they are experts that anonymity is necessary. As we have established, the idea behind a Delphi study is to achieve consensus amongst panelists. When experts give their opinions on an issue, these opinions can often differ (or even be polarizing!) in many several ways.

Anonymity amongst participants ensures that members with a “louder voice” do not stifle the opinions of others. Participants should truly feel like they are seated at a “round table” (which also gives you the leeway to identify yourself as King Arthur- consider that as a “check in the pro column” for Delphi studies).

Best results come from multiple rounds of questioning

In cases of other Delphi studies, it seems that consensus convergence is best achieved when multiple rounds of the study have been conducted. This allows the panelists to get feedback about what the overall results of the study have shown. It also gives the researcher an opportunity to tune their questions to help better understand the true opinion held by individual panelists.

In reality, many Delphi studies seem to only reach one or two rounds of questioning before the panel loses interest. The Delphi Method, after all, is a glorified survey. If your panelists are volunteering their time to help you, they can become “tired” after giving their attention to more than two surveys.

Due to this, it is important to think through the questions that you really want to ask when you’re formulating the first round of questions. This is when your participants will be the most engaged, and having a clear action plan can translate into higher-quality responses from the first round that you can use to support your investigation.

That being said- it is also important to remember that identifying a “clear split” in participant responses is also not a failure. If a panel of experts is split in their consensus for a particular topic, that alone can indicate that a topic is worth investigating further.

Summarized results are shared, between rounds, with the panelists

After each round of questioning, you, as the researcher, have the opportunity to process the responses and provide the results as feedback to your panel. By providing the “mid-study”

results to your panel, the participants can see how their opinions are received amongst their peers. This also helps to inform yourself on how you'll need to draft your next round of questions.

You'll likely start to see patterns emerge in the responses; these are categorized as "themes". For example, in my own Delphi study, my first round yielded about seven clear themes that I reported back to my panelists. I organized these themes (along with several relevant data visualizations) into a white paper that I sent to my panel via email.

Why did you choose to perform one?

My dissertation follows the design science philosophy, which involves building a prototype (instead of investigating a question that hasn't been answered before). To ensure that my prototype actually meets the needs of the people that might use such a system, I conducted a two round Delphi study to gather the opinions of individuals that work in the energy industry- specifically *market monitors*.

By using the Delphi technique, I was able to identify the "big issues" that affect market monitors in their daily work. With this data in hand, I can synthesize a requirements document to use in the construction of my prototype system.

How the technique works

This is where the method leaves your word processor and actually starts involving your panelists. Once you have identified the questions that you want to pose to your panel, it's time to put together a *research protocol* (a plan that outlines how you're going to collect data, from whom you'll collect it, how the data will be processed and stored, and how you will protect the individuals from whom you collect it).

Like it or not (and trust me, I came to "not"), a Delphi study is often categorized as Human Participant Research. In the world of research ethics, this can raise several roadblocks that you as a researcher have to overcome- the ethics review.

If you are a student in a PhD program, your advisor can help you navigate the process of developing a protocol that is likely to be approved by your university's research ethics board. Your ethics board will want to see how you are plan to protect the privacy of your participants, along with you how plan to recruit participants.

Seating the Panel

Seating a panel can take time. Sometimes it can take as long to seat the panel as it does to conduct the study. It can be frustrating, but it is worth the wait to have access to the thoughts of your participants.

The panelists have personal and professional lives. Work deadlines, planned vacation, etc. can impact the time that it takes to gather your panel and/or to gather responses. Conducting your correspondence over email and gathering responses through an online survey platform (Google Forms is an excellent choice) helps to facilitate the study without having participants physically seated in the same place.

Alright. That's probably way more than you wanted to know on a first-time read about the Delphi Method. However, I hope that this inspires new researchers to consider this method as they move forward.

If you have any questions- feel free to reach out to me- my contact information is on my website (<https://ericgrasby.xyz>)

–Eric C. Grasby | [Back Home](#) –