Interviewing Subject Matter Experts

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As estimators, we often have to obtain technical information from Subject Matter Experts (SMEs) in order to provide thorough and accurate analysis. But sometimes, getting the necessary information is easier said than done. It has been proven time and time again that an estimate is only as good as its data. If incorporating SME judgment into the estimate, then the quality of the estimate will be directly influenced by the quality of the data obtained during the SME interview.

There are three parts of the interviewing process: (1) Preparing for the interview, (2) conducting the interview, and (3) following-up after the interview is complete.

Part I: Preparing for the Interview

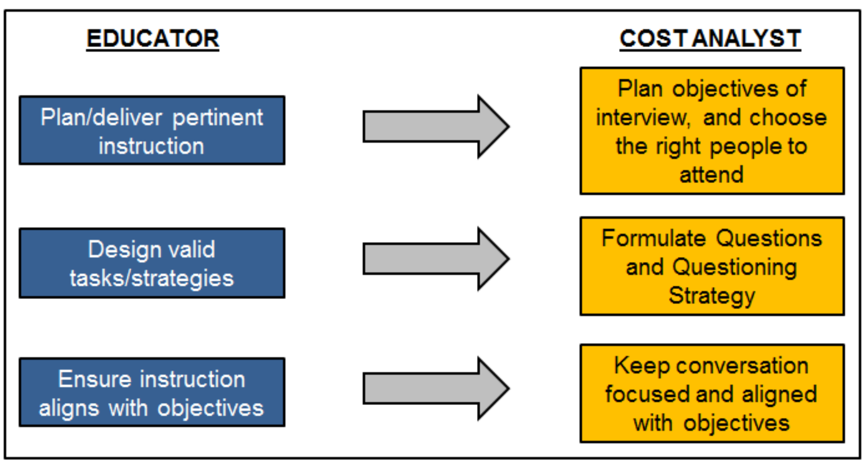
When it comes to SME interviews, information can be obtained for recovery or discovery purposes. The purpose of a recovery interview is to add to knowledge that the interviewer already has, to confirm this knowledge, and/or to support institutional knowledge. Discovery interviews, on the other hand, are used for obtaining new knowledge and new insights and/or learning about a new product or process. The type of interview, recovery or discovery, will determine the types of questions used in the interview.

Prior to the interview, it is essential that the interviewer have an understanding of three things. The first is domain knowledge. This includes understanding the industry basics, the jargon, how design decisions are made, the program's successes and failures, etc. The second is functional knowledge. This includes the scope of the program, the requirements, design, processes used, and so on. And finally, the interviewer should learn about the background of the SME. This includes what role he/she has on the team, his/her area of expertise, and experience with other programs in the past. Sometimes it is helpful to understand some personal information about the individual, which can strengthen the developing professional relationship.

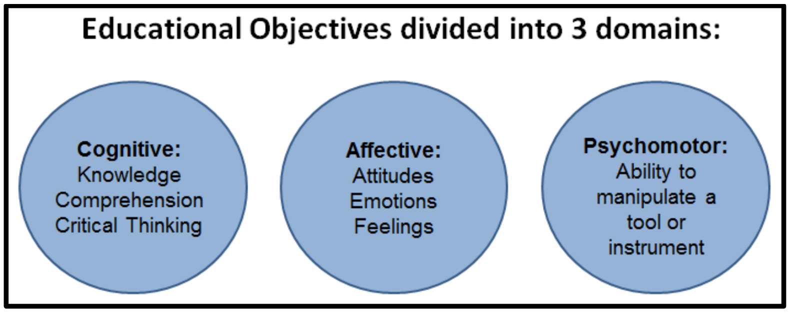
It is also essential that the interviewer prepare his/her questions and questioning strategy prior to the actual meeting. As mentioned, if the SME interview is being used as a data collection method, then the quality of questions asked will determine the quality of the estimate. To understand effective questioning, one may look at the educational theory of Bloom's Taxonomy.

Bloom's Taxonomy is named after Benjamin Bloom, an educational psychologist who published his works during the 1940s and 50s. This taxonomy classifies how people learn, which then provides a framework for educators to develop, organize and clarify learning objectives. More specifically, Bloom's Taxonomy helps with three things: (1) Plan and deliver applicable and relevant instruction, (2) design valid tasks and strategies for the students, and (3) ensure that the instruction aligns with and supports the objectives of that lesson.

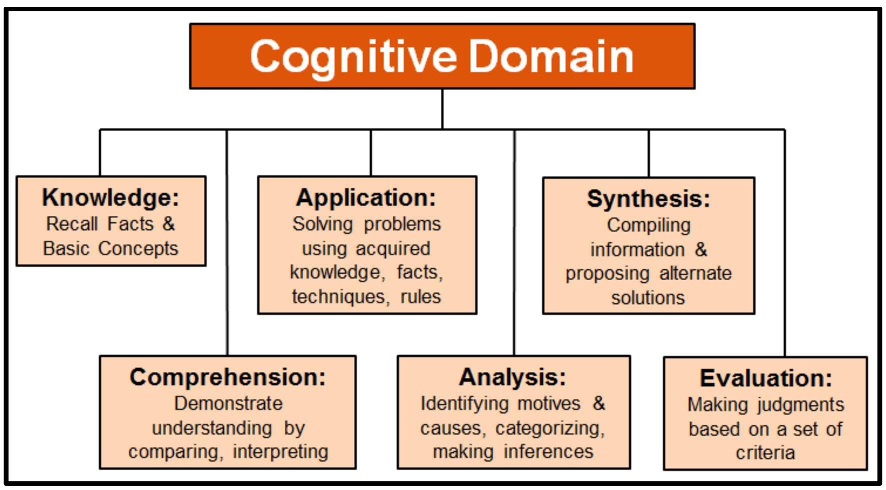
One might ask, how does Bloom's Taxonomy apply to interviewing SMEs? The three purposes of Bloom's Taxonomy for educators can be directly aligned with a cost estimator's interviewing process. An educator is planning relevant instruction while an estimator is planning the objectives of the interview and choosing the appropriate people to attend. An educator is designing lessons for the students while an estimator is formulating effective questions and a questioning strategy. And finally, an educator is ensuring the instruction aligns with the objectives while an estimator is keeping the conversation focused and aligned with his/her objectives.



Let's take a closer look at Bloom's Taxonomy. The theory divides educational objectives into three domains: (1) Cognitive, (2) Affective, and (3) Psychomotor. The Cognitive domain includes knowledge, comprehension and understanding, and critical thinking. The Affective domain encompasses attitudes, emotions and feelings, and the Psychomotor domain covers the physical ability to operate and/or manipulate a tool. Estimators will benefit greatly by the breakdown of the Cognitive domain.



The Cognitive domain is divided into six subcategories. The first is Knowledge, which includes recalling facts and basic concepts. The second is Comprehension, which includes demonstrating understanding by comparing, interpreting, etc. The third subdomain is Application, which consists of solving problems using acquired knowledge, facts, techniques and rules. The fourth is Analysis, which includes identifying motives and causes, categorizing, and making inferences. The fifth subdomain is Synthesis, which includes compiling information and proposing alternate solutions. And finally, the sixth is Evaluation, which is comprised of tasks such as making judgments based on a set of criteria.



Each subdomain provides different types of questions that an educator, or an interviewer, may ask. The difference in the use of this theory between educators and estimators is that educators use it to transfer knowledge to the students, whereas estimators may use it to transfer knowledge to themselves from the SME. But the underlying practice is still the same: Bloom's Taxonomy helps in focusing the objective of each question.

The six subdomains of the Cognitive domain provide keywords for formulating questions:

Subdomain	Keywords
Knowledge	What, When, Who, Define, Distinguish, Identify, List, Name, Recall, Reorganize, Show, State, Write, Which, Indicate, Tell How
Comprehension	Compare, Conclude, Contrast, Demonstrate, Predict, Reorder, Distinguish, Estimate, Explain, Extrapolate, Give an example of, Relate, Tell in your own words, Illustrate, Hypothesize, Outline
Application	Apply, Develop, Test, Consider, Build, Plan, Choose, How would, Construct, Solve, Demonstrate, Indicate
Analysis	Analyze, Categorize, Describe, Classify, Compare, Distinguish, Relate, Explain, What assumption, What do you
Synthesis	Think of a way, Create, Propose a plan, Put together, What would be, Suggest, Develop, Make up, What conclusion, Formulate a solution
Evaluation	Choose, Decide, Evaluate, Judge, Check, Select, Which would you consider, Defend, What is most appropriate, Indicate, Prioritize, Rate

In addition to having these keywords that provide for the purpose of the question, the type of question used will determine the quality and robustness of the response. Take, for example, a simple question such as, "Is feature x important?" This question falls into the Knowledge domain and will only allow for a "yes" or "no" answer. Although understanding the importance of feature x is necessary, a better question may be, "Why is feature x important?" A question like this will yield answers about the application of the feature and is open-ended, providing for the transfer of more information than the answer to the original question would provide. An even better question could be framed as, "Can you provide three reasons why feature x is important?" which fosters more analysis. And possibly the most effective way to ask this question is, "How is the system or user impacted by not having feature x?" requiring the SME to use critical thinking abilities in the Synthesis and Evaluation domains. This type of question probes implications and consequences, rather than viewpoints or assumptions. The more effective the question, the more critical thinking will take place on the part of the SME.

The final step in preparation for the interview is to provide logistical information to the SME in advance. To schedule the meeting, provide the SME with two or three choices in the initial request. It will also be helpful to include the expected duration of the meeting. When considering a location for the meeting, take into account the layout of the meeting area and the ambience. Choose a location that will have few distractions. Also, provide the SME with some context; in other words, "set the stage" by providing the SME with the purpose or goal of the interview. And lastly, it is helpful to provide an agenda prior to the meeting. Whether or not one should provide detailed questions in advance should be determined on a case by case basis.

Part II: Conducting the Interview

Communication is vital when it comes to the quality of the interview. To set up for a successful meeting, the interviewer must establish rapport with the SME and build credibility. The SME must have confidence that the interviewer has honest intentions and is not wasting anyone's time. First, identify yourself, your job title and your purpose on the team. Make sure to thank the SME for taking the time to meet with you. It is important to start out by reviewing the purpose of the meeting and the agenda, and also to address who will have access to the information discussed.

Then, of course, there is non-verbal communication, such as body language. Body language can convey internal emotions and mental states without using words. For example, when someone frowns or has pursed lips and is interrupting often, they may be seen as aggressive. Doodling, staring around the room, playing with a pen, watching the clock, and yawning are all indicators that the person is bored. On the other hand, sustaining a steady gaze, maintaining an appropriate distance while still being close enough to show interest, and avoiding extreme expressions can convey trustworthiness. Nodding, ignoring distractions, and leaning forward slightly are indicators that the person is being attentive.

Body language can be very powerful in creating an amicable meeting; when someone is in a comfortable and relaxed environment, they are more likely to think deeper about what is being discussed. The same goes for the SME. Be aware of his/her body language. Gestures add valuable information to the words being said. Body language can be an indication of how someone feels about a situation they are describing. If the SME is displaying body language that indicates discomfort, make some small talk to ease the tension. Humor helps.

As mentioned, listening is extremely important. Active listening is fully concentrating on what the person is saying. It includes non-verbal indicators, like nodding in agreement or understanding, and raising eyebrows in anticipation. Active listening can also be verbalized by including "yes's" and "mm hmms" during the conversation. This provides feedback to the person speaking that you are, in fact, focused on the speaker. It also provides a sense of collaboration.

During a SME interview, one should use positive facial expressions, such as smiling and nodding, and maintain eye contact. These are indications that the interviewer is interested and paying attention. It is important to be confident, but not overly assertive. Be aware of loudness of speech, tone of speech, gestures and expressions. Avoid crossed arms as this puts up an unconscious barrier. Keep an alert posture, but not rigid, and make sure to dress appropriately.

There are a lot of methods and tactics used by educators when asking students questions. Cost Estimators, again, can incorporate educational ideas into conducting the actual interview. For example, one of the biggest problems teachers have when asking a student a question is that he/she does not give the student enough time to think of the answer.

A short silence during a SME interview is not necessarily a bad thing. It could be an indication of how to proceed; for instance, the interviewer may decide to rephrase the question or ask a simpler question. A bad habit of some teachers is that they ask more than one question at a time. This can confuse the students; they may not know which question to answer, or they may even forget one of the questions. An interviewer should keep this in mind. It is important to make the verbal communication as clear as possible. One way to do so is to ask only one question at a time, and make sure they are clear, succinct, and encouraging of responses.

A well-known method of questioning used in education, specifically in law schools, is Socratic Questioning. This method was named after the Greek philosopher, Socrates (470-399 BC). Socrates believed that we all have the answers inside of us, but that we are often unaware of these answers and they need to be brought out systematically. As such, Socratic questioning provides a discussion using a series of questions that allows the teacher, or interviewer, to better understand the underlying assumptions, beliefs and contradictions. Though this method is mostly used in law schools, it is also incorporated into the field of psychology. For example, during cognitive-based therapy or cognitive reconstruction, a psychologist will guide the patient, using the Socratic Method, in understanding their underlying logic or illogical reactions and thoughts.

While this method serves law educators and psychologists well, it can also serve estimators well. Using the Socratic Method, an estimator can, respectfully, play devil's advocate. This is done by challenging assumptions of the SME, posing hypothetical situations, eliminating contradictions, and testing logic. This is also done by asking clarifying questions, such as: Can you please elaborate?; why is that important?; can you provide an example?; can you say that another way?; how would you explain that to a non-technical person? The goal of this method is for the estimator to understand how the SME thinks. What underlying assumptions has the SME made? How optimistic or pessimistic is he/she about the information being discussed? Where are the holes in the SME's logic, and how are those contradictions resolved? Leading an interview using these questioning techniques will foster more critical thinking, and it will also avoid the estimator from making their own false assumptions.

One must assume that the estimator will run into some issues during the interview. A common issue is a SME claiming that the data does not exist; "there is no data." There is always data! At this crossroad, the estimator may ask for analogous programs, and even just piece parts of analogous programs. For example, the estimator may ask for a program that was similar technically, or a program that followed a similar schedule or process, or even different programs for different pieces of hardware and software. It is important to ask for POCs for each of these programs so that Contractor Performance Reports (CPRs) may be obtained.

Another issue an estimator may encounter is that the SME is providing a point estimate that is very optimistic, or a schedule that is overly aggressive. Combat this by asking for ranges and pushing the limits on those ranges. "Could it take up to 12 months?" "What about 15 months?" "Would there be any circumstances that would cause it to take 24 months?" It is helpful to provide hypothetical situations and push the boundaries.

Sometimes the discussion with the SME can become extremely technical and difficult to understand. A good tactic in this situation is to ask for the "dumb-downed version." How would the SME explain this to someone outside of the industry? Ask for examples of products and/or situations. If the estimator is having difficulty visualizing what the SME is describing, then it is appropriate to ask for a demo or prototype. It is even helpful to ask for any videos on the subject or product. Ask if it is possible to visit the contractor's facilities and see their production line. Get your hands dirty!

Another possible road block during the interview may be that the estimator is not getting the type of answers that he/or she expected or intended. At this point, it is helpful to remember what the objective of the question originally was. Reword the question and ask clarifying questions as a means of getting to the correct type of answer. This may be a case, however, of the expert not actually knowing the answer to a question. In this situation, ask to be referred to the right person with whom you could discuss this further. Get his/her contact information and ask the SME for permission to contact that person directly. If the SME is not comfortable giving out this information, ask the SME to initiate communication with that person via an email introduction or a meeting.

As a general rule, try to remain as neutral as possible. Be aware of the sequence of the questioning and make sure to provide transitions between topics. It is up to the interviewer to keep control of the meeting and steer it back to the objectives when getting off topic. Most importantly, be in the moment and listen when the SME is providing responses.

Part III: Following-up After the Interview

While it may not seem that important, the follow-up after the interview is one of the essential steps during the process. A relationship can be made during the interview, but it could crumble if the follow-up does not happen. Following-up with the SME will insure that the relationship remains. The best way to do this is to send an email thanking the SME for taking time out of his/her schedule to meet with you. This Thanks will go a long way.

Immediately afterwards, while the interview is still fresh in your mind, it is best to review your notes and add annotations as necessary. While many people have fantastic memories, there will always be something that can slip through the cracks if this step is not executed immediately. This will also help in identifying areas that may still be misunderstood or need further clarification.

There are a few things one could do with these notes in terms of communicating with the SME. First, the analyst may provide the SME with the completed notes and ask if there are any edits that the SME would make. That way there is a record of the conversation to which both parties agree. Another thing the analyst may do is send the SME a list of questions regarding the items that are still misunderstood, or send clarification questions. This keeps the line of communication open and clears up any confusion. The analyst may also choose to send an email summarizing any action items that came out of the interview. And of course, the analyst can make any combination of these tips, and even execute all three.

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