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# What Makes a Good Research Consultant?

Justin Harding

*University of Northern Colorado*, [justin.harding@unco.edu](mailto:justin.harding@unco.edu)


Samantha Estrada

*University of Texas at Tyler*, [samantha.estr@gmail.com](mailto:samantha.estr@gmail.com)

Michael Floren

*Misericordia University*, [mfloren@misericordia.edu](mailto:mfloren@misericordia.edu)

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## What Makes a Good Research Consultant?

### **Abstract**

Statistical and research consulting is defined as the collaboration of a statistician or methodologist with another professional for devising solutions to research problems. An in-depth, interview qualitative approach was taken to answer the research question of what makes a good research consultant. The authors interviewed four faculty members in the field of statistics and research methods and two experienced graduate student consultants. In-depth, face-to-face interviews revealed common themes regarding consultancy skills, resourcefulness, communication and interpersonal skills. The participants discussed how to improve consulting sessions and deal with clients with different statistics levels and backgrounds. Participants felt there was no difference in how they approached a qualitative vs. quantitative consulting session. Finally, all the participants stated that the training of graduate student consultants can be improved by project-based coursework.

### **Keywords**

Statistical Consulting, Research Consulting, Graduate Education, Statistics Education, Academic Consulting, Consulting Center, In-Depth Interview, Qualitative Study

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## What Makes a Good Research Consultant?

Justin Harding

University of Northern Colorado, Greeley, Colorado, USA

Samantha Estrada

University of Texas at Tyler, Texas, USA

Michael Floren

Misericordia University, Dallas, Pennsylvania, USA

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*Samy pushes the 5 in the elevator in a rush to get up to the 5<sup>th</sup> floor. After arriving on the 5<sup>th</sup> floor, she walks eagerly to the middle of the building and enters the Statistical and Research Consulting Laboratory (SRCL). Justin sees Samy enter and immediately says "hello." He is happy to see her because that means that his shift is over and she will be taking the reins. Samy works a shift as a research consultant every Tuesday afternoon from 3 pm to 8 pm for the fall semester. She writes "Samy" on the white board and sits at what some consultants call the helm, which is the computer in the front of the room. She logs in and starts the time clock and her shift has officially begun. Phew, right on time! She can now take a moment to scan the 15 computers that are staring at her. There are three rows of tables with five computers on each of them. Lee is in his usual 1<sup>st</sup> chair of the 2<sup>nd</sup> row and has his eyes glued to the computer. Mike likes the back row and usually sits in the 3<sup>rd</sup> seat. The two make eye contact so a head nod is customary amongst the two regulars of the SRCL. There are currently no clients in the SRCL and this gets Samy thinking about what type of client will walk in next. Will the client be pleasant or challenging? Dealing with the human side of consulting can be as tricky as walking through a field infested with land mines. What type of statistical background will this person have? Each client that enters the lab has a vastly diverse statistical knowledge. What will the research be regarding? Every day in the SRCL, clients come in with an extremely wide range of research problems. Samy thinks about her training and wonders if she has the right statistical weapons to help the next client. Will it be a topic she has yet to*

*encounter thus needing to set up a second meeting to give herself enough time to figure out how to help? Thinking about all these obstacles leaves Samy wondering, what are the successful qualities of a research consultant?*

## **Review of Literature**

Graduate research consultants are a staple for universities all over the world. The tendency for researchers to use statistical methods to analyze their research makes a need for good research consultants. In the future, more researchers from a wide variety of fields will require assistance from academic statistical consulting centers if the assistance is useful (Vance, 2015). Traditionally, statistical consulting centers have provided core infrastructure for university research. Researchers at these universities can collaborate with the research consultants on cutting edge investigations to ensure good practice and advance literature.

A statistician must be able to effectively communicate with researchers and practitioners and be conversant in their functional areas (Belli, 2001). A research consultant often works on topics that they know nothing about which forces the consultant to learn about subjects they are unfamiliar with, meanwhile attempting to understand the goal of the research in only a brief conversation. Kirk (1991) indicates that clients in a university seek consultations on an extraordinary range of research problems. This makes training research consultants a very problematic task, as there is no way of knowing what each consultation will need. Several good academic statisticians are not suited to consulting: an ability to derive results in an idealized situation is not enough when that situation does not prevail (Russell, 2011).

Statistical training is taught in the classroom with textbook examples which consultants are expected to expand to real life situations. Formal statistical training at tertiary level provides students with important theoretical knowledge but seldom prepares them to deal with research and industry problems, nor equip them for the frequently daunting task of converting information into data that can be analyzed to answer research questions (Fletcher, 2014). The statistical knowledge that the research consultants gain in the classroom is not the only tool they need. Zahn and Isenberg (1983) reason that statistical consulting is a complex activity that requires both statistical and non-statistical skills. Non-statistical skills can be regarded as personal skills, which include the ability to communicate, ability to listen and need to be interested in statistical research. Non-statistical skills make up the biggest gap in the training of our students (Fletcher, 2014). Gaining non-statistical skills takes time and is only part of what a consultant does.

Managing a consulting session with student and faculty clients is challenging. Some clients have limited statistical and research knowledge making it difficult for the client to explain their research initiatives. Belli's (2001) respondents mentioned the fact that student research consultants have a hard time "abstracting the real problem from the story that the researcher tells" (p. 335). The job of a research consultant is best summed up by Tweedie (1998): the statistician must enter in the context of the problem not just as an "advisor," but as someone prepared to understand the data, analyze the data, interact with those who really own the questions being asked and consider the impact of statistics within the real context of the problem. Our goals are to find out qualitatively what faculty and experienced research consultants perceive as important to get a blueprint for what makes good research consultants. Next, we will be reviewing the literature in training research consultants, followed by the non-statistical side of consulting and consultancy skills.

## **Statistical and Research Training**

Training research consultants can be broken up into two important areas that are research and statistical knowledge and consultancy training. To be effective statistical collaborators, research consultants must learn the fundamental theory and methods of statistics. Marquardt (1987) explains that a consultant must, at the very least, be skilled in the following statistical techniques: multiple regression, analysis of variance, the design of experiments, nonlinear estimation, time series analysis and contingency table analyses. For many consultants, having these skills will be enough. However, there is a gap between the knowledge gained in classrooms and the proficiency needed to apply the statistics to answer real research questions. As Kenett and Thyregod (2006) indicated, the so-called “examples” in textbooks and methodological papers serve to illustrate the computations associated with a specific technique rather than the solution of a problem from real life. This is the biggest hurdle for a research consultant: understanding statistical concepts and knowing when and how to use them. Student consultants are often not exposed to real-life applications in their coursework where they are expected to determine the objectives of a research project and translate these into statistical hypotheses, nor do they ever have to decide on the appropriate analyses to answer the research questions (Fletcher, 2014).

Taking statistical classes can help graduate students with the fundamentals but it takes more to become an effective consultant on an abundant amount research topics. Very few consultations give completely standard problems, and some improvisation will probably be necessary (Russell, 2001). Additional statistical procedures needed involve knowing the research process, questionnaire design, sampling methods, data collection, data analysis and statistical report writing. A consultant can never have too much statistical knowledge (Russell, 2011). A research consultant should also be proficient with several statistical software packages and choose the one that is appropriate for a particular task. The statistical skills needed to solve complex research problems, however, should include the above-mentioned necessary theoretical foundation, a sufficient measure of proficiency in the use of several software packages, knowledge on how to design studies, the ability to identify statistical procedures that are most commonly used in consulting and how to perform appropriate analyses on a variety of different data sets (Fletcher, 2014).

The second necessary training for a research consultant is consultancy skills. A respondent of Belli (2001) cited the importance of “some training in general consulting skills like listening, attention to timeliness and physical constraints, friendliness, respect for all people” (p. 334). Unfortunately, most graduate programs in statistics give little attention to the latter area, the human side of consulting (Kirk, 1991). These skills are extremely difficult to give training examples for new consultants. How do you set up a client explaining hypothetical research problems as an exercise? There is no possible way of predicting what type of consulting a client will need help on. What is their statistical background? Can they explain what they are trying to do? Do they hate statistics? The results of Belli’s (2001) participants tell a story that consulting skills are “hard to teach” but “important to learn,” therefore, students need “lots of chances to interact with people from different disciplines with different types of problems” (p. 334). Universities with statistical research consulting programs provide a wide range of consultancy training for their research consultants. The types of consultancy training are: supervised sessions, collaborating sessions with experienced and inexperienced consultants, hypothetical situations and role playing. Belli (2001) indicated a wide range of practices in how student consultants are trained in consulting skills. Such training is essential to a statistician’s education about the problems faced by both student consultants and student clients. Formal training would benefit university research centers greatly as it would prepare students with a diverse consulting expertise needed to serve the wide range of clients they

encounter. Well-trained consultancy skills enable the university's clients to have better guidance leading to a greater impact in their research. Statistical consulting centers that focus on educating and training their statistics students in essential, nontechnical skills such as communication and collaboration to help clients use statistics to solve real-world problems will have an immediate and important impact (Vance, 2015). Consultants will benefit from formal training of consultancy skills along with the university research laboratories. Good consulting skills help the statistician to better assist the scientist and thereby improve the quality of the scientific contribution that they make (Zahn & Isenberg, 1983).

**Non-Technical and Consultancy Skills.** Nontechnical or interpersonal skills for research consultants have been well documented and cannot be undervalued for successful interactions with a wide range of researchers. Interpersonal and communication skills are needed to have successful interactions with student and faculty clients. Van Leusen, Ottenbreit-Lefwich and Brush (2016) identified eight interpersonal skills: active listening, paraphrasing, summarizing, open questioning, closed questioning, explaining concepts, addressing client's questions—explaining procedures and informal conversation. These skills are not gained overnight and consultants are always trying improve all of them. Unfortunately, these skills are not taught as part of the curriculum for most graduate statistics programs. These nontechnical skills, such as communication and collaboration, are of utmost importance yet are not learned in most statistics courses (Vance, 2015). The process is between the consultant and the client and good communication can lead to beneficial results. Statistical consulting is a collaborative venture whose success depends essentially on the effectiveness of the communication between the consultant and the client (Kenett & Thyregod, 2006).

Another type of nontechnical skill is statistical consultancy skills. For postgraduate statisticians, a crucial ability is to be able to develop consultancy skills (Sharples, Yeend, Francis, Ridall, & Booth, 2006). These skills align with communications but deal with what the consultation is about: statistics. Vance (2015) explains these skills as how to effectively listen, summarize and paraphrase; how to ask good questions; how to explain statistics to non-statisticians; how to present statistics and how to structure effective collaboration meetings and interact with clients. A consultation involves sitting down with a client and exploring the research in as much detail as possible. The consultant needs to get the client to elaborate on all the research details of the investigation. Van Leusen, Ottenbreit-Lefwich and Brush (2016) indicate the importance of effective interviewing techniques as a crucial component in understanding a client's subject area and project. There are many stages of a consultation and consultants need the right talents to be able to navigate a positive interaction. These include the ability to interact with a client, to distill the nature of the problem, to choose a suitable methodological approach and to communicate results effectively (Sharples et al., 2006).

Regrettably, not all the clients a consultant meets will be able to explain their real problem or know their research objectives. This complicates the interaction and challenges the interpersonal skills of the consultant to get the client to communicate. Belli (2001) discusses the problems student consultants have with interpersonal skills, as they need to know how to listen, establishing clear communications ask enough questions to truly understand the client's problem, negotiating a reasonable time-frame, know how to effectively run a consulting session. Learning how to manage a consulting session is extremely important to becoming a good research consultant. There is much to learn, and nothing is more important than experience but the better the research consultant, the more positive the consulting session will be. A successful consultation will leave both the client and the consultant feeling that progress has been made in solving the problem (Russell, 2011).

It takes experience, training and a firm foundation in fundamental statistics to become a good consultant. Many of the tasks needed to solve real word research problems are not taught

in classrooms. Real world problems are solved in research consulting labs when good consultants carefully weave a web of details together to come up with solutions for clients. A statistical consultant may thus be considered a professional equipped with an excellent statistical background, great personal skills and a good dose of common sense (Fletcher, 2014). Though debate exists on whether consulting can be classified as a scholarly activity, in a nationwide survey of statistical consultants, consultants declared how they perceived the universities' administrations and faculty found consulting valuable (Sharp, Wrenn, & Gerard, 2016).

### **Purpose of the Study**

Research and statistical consulting centers are incredibly valuable to universities and scholarly research. Additionally, the authors are not aware of any research on qualitative research consulting. The literature appears geared toward quantitative statistical consulting. Some concepts like nontechnical skills and consultancy skills will still be needed to conduct good qualitative consultations. There is a question as to whether some of the approaches might differ if the research is qualitative. Thus, the aim of this study is to explore the perspectives of graduate student consultants and statistics and methodology that faculty associated with the SRLC to explore what skills contribute to the development of a good research consultant. The findings of this study will help guide not only research and statistical consulting university centers, but also statistics and methodology departments which are tasked with the responsibility of developing future consultants. The present research can inform future training of methodologists and statistician consultants of the future and, thus, future scholarly research.

### **Research Questions**

RQ1: What perceived characteristics make a good research consultant?

RQ2: What is the perceived best approach for consultants to deal with the human side of consulting?

RQ3: Are the core classes and training providing consultants with realized abilities to solve real life research problems?

RQ4: Is there a perceived difference between qualitative and quantitative consultations?

### **Methodology**

Before any data collection took place, the authors received approval from the Institutional Review Board (IRB). For the present study, the methodological framework was that of a qualitative research study based on in-depth interviews and the collection of artifacts.

### **Researcher Stance**

In general, our interest in this study came from a belief that experienced consultants from a variety of backgrounds would provide valuable insight into the skills necessary to make graduate research consultants successful.

I, Justin Harding, am excited about this research. I hope this research provides a better understanding of the complicated process of research consulting. My experience gaining skills as a research consultant in the SRCL was not an easy process as there is always a need to improve and learn from consultations. I believe that some types of consultants are more successful than others and being able to understand what makes certain people successful could

surface new perspectives and solutions for others. As a senior research consultant who has worked on many projects the last four to five years, my fascination comes from trying to help train and guide new and upcoming consultants as the process involves many different facets. Researchers are constantly challenging consultants with complex designs and consultants continually need more knowledge and growth.

At the time of this study, I, Samantha Estrada, had been a graduate consultant in the SRCL for approximately five years specializing in survey and measurement methodologies. During my Master's (at a different university than RMU) I took a number of courses in statistical consulting; however, while working in the SRCL as a graduate consultant I discovered the nuances of consulting with clients at different stages of research such as research design to statistical analysis as well as consulting in qualitative projects. In other words, I felt coursework did not prepare me to consult in "real life." Through my experience at the SRCL, I developed an interest in studying the area of research consulting in order to provide resources for future generation of research and statistics graduate students, graduate student consultants and faculty teaching the topic of research consulting.

I, Michael Floren, was first introduced to statistical consulting through the SRC though I did not work in the SRCL at the time of this study. However, I continued to consult with clients independently. I have training in a variety of consulting methods and topics and have worked on a variety of qualitative research projects as a Master's and PhD student. Though not currently affiliated with the SRCL, during my years as a graduate research consultant I was passionate about improving the quality of consulting offered to clients, working to better train consultants and to secure funding to provide materials for improved services.

## Setting

The SRCL is a resource at the Rocky Mountain University (RMU, a pseudonym) which provides free consulting to both students and faculty since 1997. Graduate students in statistics and research methods programs are hired as research consultants to help guide graduate students, undergraduate students, or faculty on research for their thesis, dissertation, grants, or publications. Approximately 15-18 consultants are hired per semester.

Research consulting is a necessary element for many graduate students and faculty in preparing publishable quality research and proposals for external funding. In the academic year of 2016-2017, a total of 239 clients utilized the services of the SRCL. The majority of the clients reported coming from the education and social sciences (56%;  $n=133$ ), with a smaller amount coming from the natural sciences (34%;  $n=82$ ) and other various programs (10%;  $n=24$ ). The SRCL consultants aid graduate students, undergraduate students, and faculty with a variety research and statistical topics. In addition to being comfortable working with individuals from a variety of backgrounds, consultants also need to be familiar with both qualitative and quantitative methodologies. During the 2016-2017 academic year, 21% ( $n=49$ ) of consultations were qualitative and 79% ( $n=190$ ) of consultations were quantitative.

## Participants

The participants consisted of both faculty and graduate students from the statistics and research methods program at RMU. The graduate students worked in the SRCL at least two years, share a common educational background, and have participated in one-day consultation trainings prior to each semester. Purposive sampling was used in this study to select participants who could provide the most insight regarding the topic of interest (Merriam & Tisdell, 2016). Table 1 includes a brief description of participants asked to participate in this study. Each interviewee received a pseudonym used throughout the research process.



Table 1. *Descriptions of Participants (Using Pseudonyms)*

<b>Faculty</b>
Dr. Yellow — Expertise in qualitative methods and research ethics
Dr. Grey — Expertise in mixed methods research, experienced consultant
Dr. Green — Expertise in research methods, has served as director of SRCL
Dr. White — Expertise in applied statistics, has served as director of SRCL
<b>Graduate Student Consultants</b>
Mr. Red — Doctoral student, SRCL consultant for four years
Ms. Blue — Doctoral student, SRCL consultant for two years

## Data Collection

We utilized interviews with individuals in multiple roles to examine a variety of perspectives on research consulting: interviews with consultants, interviews with former SRCL directors, and interviews with program professors. Additionally, artifact data (e.g., syllabi, training manuals) were collected to triangulate themes that emerged in the data analysis process.

**Interviews.** In-depth interviews are intensive, asking a small number of participants to elicit detailed information regarding the participants' perspectives (Boyce & Neale, 2006). All participants were willing to participate in the interview process. In-depth interviews were audio recorded with each participant's permission. Prior to the interview, participants were asked to read and sign a consent form. The interviews lasted between 45-60 minutes. Semi-structured interview questions were used to guide discussion, but the focus was on letting interviewees express their feelings and perceptions regarding statistical consulting. A list of interview questions is included in Appendix A. Transcriptions of the recordings were made for each interview.

After transcription, the data were coded to help assist in determining common themes and significant statements. The authors performed thematic analysis using QSR International's NVIVO 10 Software. The process of thematic analysis identifies emergent themes in the data (Taylor & Bogdan, 1984). Prior to identification of themes, the authors read each transcript at least three times to familiarize themselves with the content. Commonalities among interviews were recorded and potential themes were noted. After familiarization, the participants' words were used to form themes.

**Artifacts.** Artifacts were collected to better understand and illustrate the experience of being a research consultant in the SRCL. Artifacts were analyzed in conjunction with the interview data collected (Merriam & Tisdell, 2016). In this study we utilized three types of artifacts: the consultation training manual, the course syllabi, and consultation records. The training manual is used to identify training procedures given at the beginning of each semester in the SRCL. The course syllabi are used to identify areas of formal training on topics which consultants should be able to discuss in consultation sessions. The consultation records are used to identify the common situations dealt with by consultants.

**Training manual.** The training manual is a supplementary material provided to all consultants during their initial training. It describes the curriculum discussed during this training and provides additional resources that consultants can seek out. The training includes: introductions on commonly used analysis software (i.e., SAS, SPSS, R, NVIVO), illustrations of initial consultations for clients, role-plays exemplifying positive and negative client

interactions, and generic expectations of research consultants. These sessions are presented by the director of the lab and/or experienced consultants.

**Syllabi.** The syllabi collected for this study were used to illustrate the topics covered in the two common core courses required for consultants in the SRCL. The first course was Introduction to Research, where topics such as qualitative methods, mixed methods, reliability, validity, sampling, and research design were covered. The second course was Applied Statistics, where basic statistics topics such as analysis of variance, regression, and chi-square methods were covered.

**Consultation records.** The SRCL keeps detailed records of each consultation. These records include the client's demographic information (e.g., field of study and academic level), the nature of the research questions, the type of analysis performed (if any), what type of software was used (if any) and other descriptive information. Consultation records are electronically collected immediately after each consultation.

### **Trustworthiness**

The researchers took several measures to enhance the trustworthiness of this study. Triangulation was used to strengthen the design using multiple sources and decrease researcher bias (Denzin, 2017). These multiple sources included consultant and faculty interviews and artifacts such as consultation records and syllabi. Also, member checks were conducted to ensure the aims, methods, and conclusions of the study aligned with the self-perceived views of the participants (Merriam & Tisdell, 2016). All participants were offered an opportunity to provide feedback on their transcription and the completed write-up of the study. All feedback provided by participants was incorporated into the final manuscript. Finally, researchers performed a peer examination of the data and findings (Creswell & Poth, 2018; Merriam & Tisdell, 2016). An unaffiliated research consultant reviewed the findings and interpretations to ensure that they did not misrepresent the perspectives of the participants.

### **Findings**

The findings for this study are organized in the same order as the research questions.

#### **RQ1: What are the perceived characteristics that make a good research consultant?**

Participants felt that consulting has a combination of many different talents to be an effective research consultant—such as content knowledge and resourcefulness. In Dr. White's words, "An ideal consultant has some training in traditional statistics and a general knowledge of available methods." Additionally, the faculty interviewed showed distinction between formal training and familiarity with a wide variety of methods that the consultants which may or may not form part of the consultant's training. The faculty agreed that the consultant needs to be a good learner to be able to pick up on new methods on the spot. Drawing on previous statistical knowledge can help guide consultants to solve research questions, but they also need to be able to research and find information. Dr. Grey explains, "You do need to have knowledge, but not necessarily of every single thing. You have to have enough knowledge on where to go to get additional information and help." To this end, Dr. Gray proposed using workshops in a variety of topic such as statistical software (i.e., R, SPSS, SAS), qualitative software (i.e., NVIVO, Atlas), research design, developing research questions among other topics as a way for students to gain exposure: "The more workshops we can take, the better off

we are.” Though a strong statistical background is very useful and can help guide many consultations, a consultant needs to be resourceful. Dr. White explains that “a consultant must have an interest/ability to independently find answers to interesting problems, basically, find a way to get things done.” This adds a component to the content knowledge of skilled consultants, namely, they need to be able to learn and adapt. Consultant resourcefulness was not addressed specifically in the literature on statistical consulting, but the participants in this study considered it a valuable skill.

Having a strong statistical background is ideal for any consultant, but the participants felt that consultants needed strong interpersonal skills to be effective. Dr. Green indicates,

I think they will have both good communication and people skills as well as the technical skills. And I’m not sure I’d put technical over the people with communication skills, because you could have all the technical knowledge in the world and be a horrible consultant.

Mr. Red adds his student consultant perspective, “In general, I think that there’s a balance between content knowledge and soft skills that a consultant really has to utilize both and if one is missing you’re not a good consultant.” On this matter, Dr. Yellow agrees, “You can know a whole lot about how to do a study but that doesn’t mean you know how to communicate with people.” In summary, participants agreed with the literature that interpersonal skills are a vital part to good research consultants.

The participants agree that a consultant needs to be able to have certain skills. Participants discussed the best approach to a research consultation session which included making the client feel comfortable while simultaneously asking many questions focusing on the client’s research. Dr. Grey says there is a good way to start every consultation; “there is a step one and the first one is to get to know them.” As a consultant, you are building a relationship with the client and the best way to do that is to find out about them. Dr. Yellow recommends a simple approach to a consultation session: “Do a lot of listening first; have open ended questions where we listen.” The goal is to find out about the clients as well as their research. Simply by getting to know clients, consultants help them feel relaxed which leads to better consultations. Likewise, Dr. Green suggests “just making them feel comfortable and again be[ing] able to read them, being able to ask the right questions. And asking the right questions comes first and foremost.” Asking the right questions and listening to the client is an effective way to build a shared foundation that will help guide their research. Student consultants agree with the perspectives of the faculty interviewed; for example, Miss Blue explains, “I make sure the research question is right and that I understand their need for that research as much as they understand it. So together it’s a mutual understanding.”

Another component of good consultancy skills is respectful communication. Dr. Yellow explains, “They [the clients] want to know a consultant has a lot of information and they know how to convey it to you in a kind and considerate way.” The clients are trying to use the skills of the statistical consultant and the consultant must be able to explain to them in ways that the clients can understand. Mr. Red clarifies, “Somebody that can explain things in layman’s terms is huge. If they [the clients] aren’t getting it, explaining it in a different way [helps].” To these recommendations Dr. White adds, “The consultant must understand how to interact with non-statisticians and non-researchers.” A client’s statistical knowledge could vary widely, and the consultant must be able to communicate with both experienced and inexperienced researchers in a thoughtful way. Dr. Yellow warns of what could happen during a consultation session if the research consultant lacks good communication skills: “as soon as a person starts to feel stupid, they shut down their ability to try and understand you.”

Consultants who know how to talk with researchers about their projects can prevent clients from “shutting down” and, in turn, build a better consultation experience.

## **RQ2: What is the perceived best approach for consultants to deal with the human side of consulting?**

Consultancy skills proved to be an important part of building positive consultation experiences. Participants felt that being welcoming and friendly go a long way to build a positive consultation experience. Dr. Grey mentions, “Greeting people when they come into the consulting lab, I think, is a really important thing.” It can be a big step for some clients to go to the university statistical and consulting center for help. For example, the SRCL can be intimidating, the client walks into a room full of computers with research posters and statistical and research software posters pinned to the walls and during peak hours graduate students from various academic fields either work in their own research projects or are already in the middle of a consultation session. On one hand, for new graduate students it may be intimidating as they are currently enrolled in their introductory graduate statistics course. On the other hand, faculty can experience uncertainty as to what the SRLC can help with as this can vary by research consulting center given that services can vary from aiding with data collection to only aiding with research design and analysis. For example, some consulting centers may only help with research design and analysis while others may help even with research design, analysis and even writing of results while expecting authorship for the contribution. Thus, welcoming them when they walk in can build a friendly environment and help to ease that tension. Mr. Red explains, “Well I think I am approachable. I think it’s the biggest thing when people come into the lab.” When the client feels comfortable with a consultant it will be easier for them to try and talk about their research. Miss Blue offers a very simple advice to consultants” “Just smiling, you know. It is not complicated things.” The participants conclude that a friendly introduction is good foundation to build a good client/consultant relationship.

Participants in this study discussed that calibrating the client’s knowledge of statistics and research is extremely important. Within the SRCL, consultants focus on guiding the client on what type of design or analysis works best for their case given that the consultants are graduate students they are forbidden from completing the work for the client. However, this is encouraged as private consulting outside the SRLC. Given this setting, Dr. Grey stresses that “some consultants feel like they have to show off their knowledge and take a novice researcher and have them do some complex model to solve their questions. Knowing the client’s level of knowledge should guide the consultant to choose the type of analysis.” It is important to point out that this issue may not arise in private consulting it can depend on the mission statement of the consulting center. Mr. Red recalls his own experience in the early stages of consulting in the SRCL. “I learned very early to ask what the client’s statistical background is. I found that to be one of the most important questions that I ask because it gauges the level of our conversation from that point forward.” This means being able to talk in statistical terms depending on the type of client that the consultant is working with. Communicating at the level of the client will build the relationship and advancement of the research project. Dr. Green states, “And so I think the idea of, let’s have a conversation, let’s find out where the client is in terms of their skill level and then meet them there.” Others warn against consultants using technical language to demonstrate their knowledge. Knowing the client can help the consultant guide the conversation on the type of analysis that will be appropriate for their research and statistical abilities. Overall, the participants felt that a consultant needs to adjust differently to clients that have different foundations of statistics and research to best meet their needs.

In this study, participants felt that there are always going to be negative experiences. Mr. Red explains, “Most of the times when you explain things that way they come off pretty

good but there is always gonna be that negative experience.” Clients may come in to the SRCL stressed because of deadlines, previous research failures, or concerns about methodology. For example, in the SRCL, many of the graduate student clients have just begun working on a project for which their advisor is the expert; to add to their stress, they are simultaneously taking their first graduate statistics courses. These clients may not understand the research process yet and may have different expectations and as a result put the consultant into an uncomfortable position. Our participants believed that, as a consultant, the best thing that you can do is try to learn from these negative experiences and improve because of them. For example, Dr. Grey indicates that:

You know, there is always more to learn. As embarrassing and kind of emotionally uncomfortable as those situations are, I really do appreciate them, because for every one of those hopefully in the future I can have a productive relationship or many productive relationships simply by altering how I approach the situation [*sic*] in expectations that I come in with.

Another potentially uncomfortable experience that a consultant could face is being unfamiliar with a subject or statistical technique which the client requests. On this regard, Miss Blue says that “you have to be comfortable not knowing all of the answers up front and be ok with having to do some background research to help clients.” Dr. Green adds that after talking to a client, “then, if you don’t know the answers because maybe it is not your area of expertise, feeling comfortable enough to take notes and say this is something ‘I don’t know a lot about but I’m gonna find the answer.’” Most participants agree that every consultant will encounter a situation where they will not have the answer and it is reasonable to take time to do some research. In fact, they encourage consultants to feel comfortable taking their time during a consultation session.

### **RQ3: Are the core classes and training providing consultants with realized abilities to solve real life research problems?**

The participants felt that the core classes provide the theoretical fundamentals of statistical methods but indicate that they do not quite translate to consulting real research situations. Dr. Green states that “I think sometimes an issue that maybe we don’t as faculty, we don’t always do our students a favor by only talking about the theoretical.” Dr. Grey adds, “I just don’t think we have applied enough.” Having theoretical fundamentals are useful but being able to apply statistical knowledge is key to be a good consultant. From a student consultant perspective Miss Blue explains

I thought that the core classes were very important in terms of core foundations to deal with approaches for the vast majority of problems that clients come in with. That said I think that the course themselves tend more towards the computational and statistical than the practical.

There is a perceived problem for statistics students taking theoretical foundations and applying them to real research problems. For example, Mr. Red feels that “the core classes give you the knowledge to understand how to answer the client’s research questions, but sometimes I feel like there’s a disconnect.” The overall perception is that the core classes are not giving graduate student consultants the proper theoretical training needed to consult real situations rather these are acquired by practicing consulting.

Alternatively, participants felt that research methodology and statistics courses which were project based (rather than test based), helped to better prepare them for work as a consultant. In these courses, graduate students learn the research process from start to finish, from developing a rationale and research question to data collection and analysis including dealing with data complications and writing of results. Dr. Green mentions that it is important for courses

. . . to have projects, and the reason for that is I always have the philosophy is that you learn how to do research by doing research, you don't learn about it by just reading about it; and so I think that's the same thing with consulting.

Finally, Dr. Yellow included, "I think that the classes get people ready for research by giving students applied projects." Having the students go through each step of the research process helps prepare students for situations in the consulting lab. Miss Blue details her experience as a graduate student and student consultant: "[for these courses] we are asked to complete projects of manuscript quality from beginning to end. This helps us as students understand the problems we or clients may face when designing a real study." In this study, the participants concluded that project-based courses help prepare consultants to better aid clients rather than a pure theoretical approach to coursework.

#### **RQ4: Is there a perceived difference between qualitative and quantitative consultations?**

The participants felt that as a consultant, the initial approach to qualitative and quantitative consultations will be similar but consulting on the findings will be different. Dr. Green states, "I don't think the process is different, I mean I would start consulting conversation exactly the same way, 'so what are you interested in studying,' 'where are you in the process,' 'tell me a little bit about your purpose.'" Dr. White agrees that, "The same general principles of consulting apply to both." The participants felt that the initial consultation would be similar as the goal will be to learn about the project and the research goals. Though there are initial similarities, the participants agreed that there is a difference in the analytical approach. Miss Blue indicated "The [initial] approach is the same. What is your research question? What are you trying to gain from your research? But software and analysis are different." For instance, in a qualitative project, the researcher needs to determine their theoretical perspective, which is often not required of quantitative researchers. Dr. Yellow suggests that, "I think in qualitative we need to figure out their theoretical framework." For qualitative consultations with researchers who are used to quantitative approaches, consultants will need to guide their clients in understanding and defining a theoretical perspective. Dr. Grey says, "the only difference that I can see is how maybe they write things up, and sometimes they don't know what a theoretical perspective is in qualitative." However, a closer examination an artifact, in the form of the syllabi of the Introduction to Graduate Research course indicates that qualitative concepts are covered in the course. It is important to note that while qualitative concepts may be covered in this introduction course the class itself is not a project-based course and graduate consultants have the option of focusing on the quantitative aspects of the course. More importantly, their participants agreed that the process of conducting a qualitative or quantitative consulting session is similar initial process.

### **Limitations**

Consultancy skills was an elusive topic amongst the participants in the study. There were many good ideas such as supervised consultations, pairing inexperienced consultants with

experienced ones, or even a consulting class. However, the researchers could not establish a clear theme from the participants that left this topic, sadly, without a clear finding. The statistics and research methods program at RMU added a consulting class after the research for this study was conducted. In the future, it would be interesting to find out how this class is improving consultant training. Consultancy skills is a gap that needs to be addressed in the training of graduate student consultants in the SRCL and should be seriously considered a priority in other university consulting centers.

### Discussion of Findings

Statistical research consulting is a very complex task. The participants thought that an ideal research consultant is one that has a solid content statistical knowledge combined with great interpersonal skills. They also thought that being friendly, finding out the statistical level of the client and self-reflection are the best ways to deal with the human side of consulting (clients). This is the type of non-statistical skills that Stegman (1985) argued was the most important to teach to new consultant and that Fletcher (2014) believed was the biggest gap in the training of consultants. Yet none of the participants discussed consultancy training for the graduate student consultants. This may be a gap that needs to be addressed in initial training of graduate student consultants in this SRCL and should be considered in other university consulting centers. The participants feel that the core classes for RMU statistical and research methods provide a nice theoretical framework but still understood that not everything could be learned in the classroom. Further, the participants favor courses which are project based and gives the graduate consultants the opportunity to complete research from beginning to end. Moreover, participants felt that courses that include projects help consultants gain insight into the research process which, in turn, helps them as consultants. These findings align with the guidelines for assessment and instruction in statistics (GAISE) report published by the American Statistical Association (2016). Finally, the participants felt that consultations involving quantitative and qualitative methods are initially similar but consulting on the analytic approach and findings differ between methods.

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## Appendix A

### Consultant Interview Questions

1. Think back to a consulting situation that sticks out in your mind. Can you describe that situation for me?
2. What is it like to deal with a wide range of clients from diverse majors and backgrounds?
3. When you were hired as a research consultant, there was a one day training that provides examples on dealing with clients, in what ways do you think these examples help prepare you for real clients in the consulting lab? Please explain? *Consultants only*



4. In what ways do core research methods and statistical classes get consultants prepared to solve real world research problems in the consulting lab? Please explain.
5. In what ways do core research and statistical classes lack in training consultants to solve real world research problems in the consulting lab? Please explain.
6. What do you feel are your strengths as a research consultant? Please explain  
*Consultants only*
7. What do you feel are areas that you need work on as a research consultant? Please explain  
*Consultants only*
8. In your opinion, what are the characteristics that make an ideal research consultants? Please explain
9. Do you feel like there is any differences between qualitative and quantitative consultations? Please explain them

### Author Note

Justin Harding has a master's degree in Applied Statistics and is a doctoral student in the Applied Statistics and Research Methods program at the University of Northern Colorado. Correspondence regarding this article can be addressed directly to: [justin.harding@unco.edu](mailto:justin.harding@unco.edu).

Samantha Estrada has a PhD in Applied Statistics and Research Methods. She teaches undergraduate courses in statistics and research methods to psychology students. Recent publications include *Air Medical Journal* (2019) and the *Journal of Applied Measurement* (2018) and an appendix in the book *Ethics for Social Science Research: Becoming Culturally Responsive* (2017). Her research interests include statistics education, survey development and measurement. Correspondence regarding this article can also be addressed directly to: Samantha Estrada [samantha.estr@gmail.com](mailto:samantha.estr@gmail.com).

Michael Floren, Ph.D. is an Assistant Professor for the statistics program at Misericordia University. He has recently served as a consultant on projects in medicine, education, psychology, and public health. He is currently developing a student-driven statistical consulting center to serve the university and local community. Correspondence regarding this article can also be addressed directly to: Michael Floren [mfloren@misericordia.edu](mailto:mfloren@misericordia.edu).

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