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Bridging the information gap between beginning and experienced farmers

Cover Page Footnote

McKayla Robinette holds a B.S. in Environmental Studies with a Concentration in Sustainable Agriculture (2020) from Brevard College. She is currently pursuing a M.S. in Rural Sociology at Auburn University. When she is not in school, Robinette is an active employee on her family's grass-fed cattle operation and at her family's USDA slaughter and processing facility in eastern North Carolina. Dr. Maureen Drinkard holds a Ph.D. in Ecology from Kent State University (2012). Dr. Drinkard has a diverse academic and personal background spanning interests in ecology, environmental science, GIS, and sustainability. She has published work in riparian community dynamics in international and national journals. Although her first love was aquatic insect ecology, sustainability on all scales has become her area of expertise. In addition to college teaching, she also works with community groups and individuals to show them how to meet their sustainability goals. Dr. Drinkard has a genuine passion for teaching science. She currently is a primary investigator on an NSF grant to improve student STEM outcomes by using remote-controlled drones (land, air, and water) to collect environmental data from afar. She is also working with students on a project to map the distribution of burying beetles (Coleoptera Silphidae) across the Southern Appalachian Mountains. She has received both the Exemplary Teacher Award (2018) and the Outstanding Faculty Award (2019) at Brevard College. Dr. Drinkard's infectious enthusiasm will drive you to find authentic connections to the material you discover in her classes. Gina Raicovich holds an M.S. in Environmental Studies from the University of Montana where she focused her studies on sustainable agriculture and natural resource conflict resolution. She has worked as an experiential educator in both wilderness and agricultural settings. Her work in agriculture has focused on collegiate educational farms where she teaches with a passion for ecological and regenerative agriculture. She has the opportunity to design and implement educational farms at both Sewanee: University of the South and Brevard College (which is currently in the implementation phase). Her current work at Brevard College has also involved the creation of curricula for a B.S. program in Environmental Studies a Concentration in Sustainable Agriculture and Agriculture Education Teaching Licensure. In addition to her work within the college system Gina owns and runs Sparrow Hill Farm where she raises a variety of livestock and poultry products.

I. Introduction

The agricultural industry is integral to global food security in meeting the needs of a burgeoning population. Many pressures are impacting agricultural economies and one important factor is the number of experienced farmers. Farm families embedded with generational agricultural knowledge are being replaced by beginning farmers who are struggling to succeed when faced with agricultural hardships. The average American citizen is between three and four generations removed from a farming occupation, creating a gap in knowledge between the perceptions of a consumer towards the role of farmers and a loss of general farming knowledge (Bufkin, 2015).

The United States Census of Agriculture (USCA) is conducted once every five years and provides a complete county of U.S. farmers and ranchers and their demographics. Reported in the 2017 census, the average age of a farmer is fifty-seven years of age. The USCA defines beginning farmers as having ten years or less of experience and reports their average age of forty-six years of age. Beginning farmers represent twenty-seven percent of the total U.S. farmers in 2017. Beginning farmers represent twenty-seven percent of the total population of farmers in 2017 (United States Department of Agriculture, 2019). Only eight percent of the total farming population is thirty-five years old or younger. And, thirty-four percent of farmers are sixty-five years old, or older (United States Department of Agriculture, 2019). Midwestern states have a higher concentration of young farmers, while farmers in southern states are statistically older than the rest of the country (United States Department of Agriculture, 2019). Moreover, seventy-four percent of farmers live on their farm (United States Department of Agriculture, 2019). Sixty-one percent of farmers reported having worked off the farm at some point during their tenure (United States Department of Agriculture, 2019). Farmers often pursue careers outside of their farming operation, as fifty-eight percent of farmers have a

primary occupation other than farming (United States Department of Agriculture, 2019). The available information about beginning farmers suggests that the stereotype of beginning farmers as young and lacking life experience is incorrect. Most beginning farmers are middle-aged and have had careers outside of their farming operation. The demographic of beginning farmers play an integral role in producing food and other resources for the world's growing population. Ensuring the success of the next generation of farmers is a critical endeavor and supporting beginning farmers with the resources they need is one of many challenges.

The financial and emotional strains farmers undergo should not be taken lightly. In 2018, eighty-two percent of U.S. farm household income came from off-farm work (Bunge & Newman, 2018). The same year, 498 farms filed for bankruptcy (American Farm Bureau, 2019), and farmer suicide rates reached five times higher than the national average (Farmer Progress, 2018). The United States Department of Agriculture Risk Management Agency (RMA) works to promote and strengthen economic stability through the mitigation of risks. The RMA provides support for beginning farmers in the areas of agricultural production that the agency views as vital farming operations. The agency identifies the five general areas of risk for beginning farmers as production, market, financial, institutional, and personal risk (Risk in Agriculture, n.d.). It is important to note that farm programs designed to assist producers in managing risks and recover from disasters account for less than one percent of the total U.S. federal budget (American Farm Bureau Federation, n.d.). This lack of funding is indicative of the lack of support given to farmers in need of assistance. This, in turn, affects their productivity and chances of success.

Existing farmer services are slow to adapt to the interests and needs of beginning farmers and are reluctant to break away from the one size fits all model of farming (Ikerd, n.d.). When exploring the needs of beginning farmers and their available resources, it is important to understand the demographics, their work environments, and their experiences. Taking this into account when creating new

resources ensures that the information shared is relevant, rather than created out of assumptions. For example, agricultural extension agents, who are employed by state-funded agricultural extension services, communicate new developments to all farmers based on research completed by land grant universities. The focus of the research conducted is influenced by the land grant university's encouragement of technological advancement and reports that are performed out of curiosity, rather than improving the lives of farmers (Hightower, 1972). Resources developed are often conducted without the direct input of the intended users and therefore, may be inappropriate for beginning farmers. Better outcomes are noted when resources are co-produced by farmers, researchers, and agricultural assistants in conjunction with extension agents (Restrepo et al., 2018). In these cases, farmers are better able to intentionally improve their farming practices using resources that were created with them in mind (Restrepo et al., 2018).

Moreover, several studies show that farmers prefer the use of online resources. In an Iowa study, many farmers prefer the use of webinars and downloadable publications to offline resources (Arbuckle & Sternweis, 2013). Additionally, seventy percent of farmers are online daily, with a third going online multiple times a day and forty-four percent of farmers learn information about their farming operations from video sharing sites such as YouTube (Walter, 2017). Furthermore, sixty-seven percent of farmers use their cell phones or tablets for video or audio multiple times a day (Farm Journal Media, 2017). Despite this preference, eighty percent of American households lack a reliable and affordable internet connection (United States Federal Communications Commission, 2018) and beginning farmers may not have the resources for a high quality internet connection.

It is clear that beginning farmers face both the challenges that experienced farmers face in addition to novel issues unique to their demographic. The research conducted in this study evaluated the unique sets of challenges that beginning

farmers navigate and worked to determine the best solutions to address concerns specific to the beginning farmer demographic.

II. Materials and Methods

Survey Tool

To gauge perceptions and opinions on the educational needs of beginning farmers, a survey was administered to volunteers, which appear in *Appendix A* via social media and other digital outreach in the Spring of 2019. The questions in the survey were generated to identify demographics, experience in farming, access to educational resources, and areas where more information is needed. The survey questions were based on national baseline data found through the USCA. Some of the questions required Likert-type scale responses while others were open-ended.

Data Collection

After obtaining Institutional Review Board approval from Brevard College (Brevard, NC, USA) and informed consent from participants, individuals were asked to complete an online survey that was generated in Google Forms. The purpose of the Farmer Questionnaire was to determine how personal agricultural networks compared to third party data, as well as establish a network of farmers for reference. The survey was made available on April 18, 2019 and was closed for participation on July 1, 2019. To maximize participation, this survey was shared widely across private and public social media and agricultural specific websites and organizations (Table 1). This survey was open to anyone from any demographic and any agricultural experience.

Table 1. The survey link was advertised on the following websites in April 2019. The page membership shown was current as of February 2020.

Group Name	Link	Membership
CommonGround Forum	https://www.facebook.com/groups/449500718430922/	238
National FFA Member Group	https://www.facebook.com/groups/1129309780458725/	6,270
Women in Agriculture	https://www.facebook.com/groups/SFwia/	84,838
Grass Fed Beef	https://www.facebook.com/groups/grassfedbeef/	5,112
CRS Farmer to Farmer Connecting Group	https://www.facebook.com/groups/979840875467579/	180
Science-based Women in Ag	https://www.facebook.com/groups/1576449549335259/	2,537
Appalachian State Sustainable Development	https://www.facebook.com/groups/APPSTATEsustainableDevelopment/	833
Ag Bloggers	https://www.facebook.com/groups/AgBloggers/	172
How to Start a Cannabis Farm	https://www.facebook.com/groups/260433707854408/	33
NFU Beginning Farmers Forum	https://www.facebook.com/groups/NFUBFF/	1,289
American Agri-Women Members	https://www.facebook.com/groups/387504965245464/	30
WV Young and Beginning Farmers	https://www.facebook.com/groups/WVYoungandBeginningFarmers/	223
Brevard College Agriculture Club	https://brevard.edu/clubs-organizations/	18
Personal LinkedIn Account	LinkedIn: https://www.linkedin.com/in/mckaylarobinette	LinkedIn: 141 connections
Personal Facebook Account	Facebook: https://m.facebook.com/mckayla.robinette	Facebook: 1,426 friends
Personal Twitter Account	Twitter: https://twitter.com/mckaylarose99	Twitter: 496 followers
Friends in the Agricultural Industry		

Statistical Analysis

For categorical questions, descriptive statistics were used to explore patterns. Where appropriate, survey data responses were valued (Not important = 0, Moderately Important = 1, Most Important = 2). When comparing between beginning farmers (BF) and experienced farmers (EF) mean (SE) was calculated and a Student's T-Test was used (Two-sample, equal variance). A chi-square test of independence was performed to examine the relation between experience in farming and perception of importance of various components of agriculture business. All descriptive and basic statistics were analyzed using Google Sheets.

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III. Results

During this study, fifty-eight farmers responded to the Farmer Questionnaire (Figure 1). There were twenty-three (19%) respondents who identified as beginning farmers and thirty-five (81%) who identified as experienced farmers. The respondents produce a variety of agricultural products and beginning farmers grew produce at a higher rate (Figure 2). Livestock and crop operations were common areas of specialty amongst both beginning and experienced farmers. Beginning

farmers reported being more involved in produce operations than experienced farmers, making produce the third most reported category. Seven farmers responded that they operate or work on apiaries, horticultural, or poultry operations.

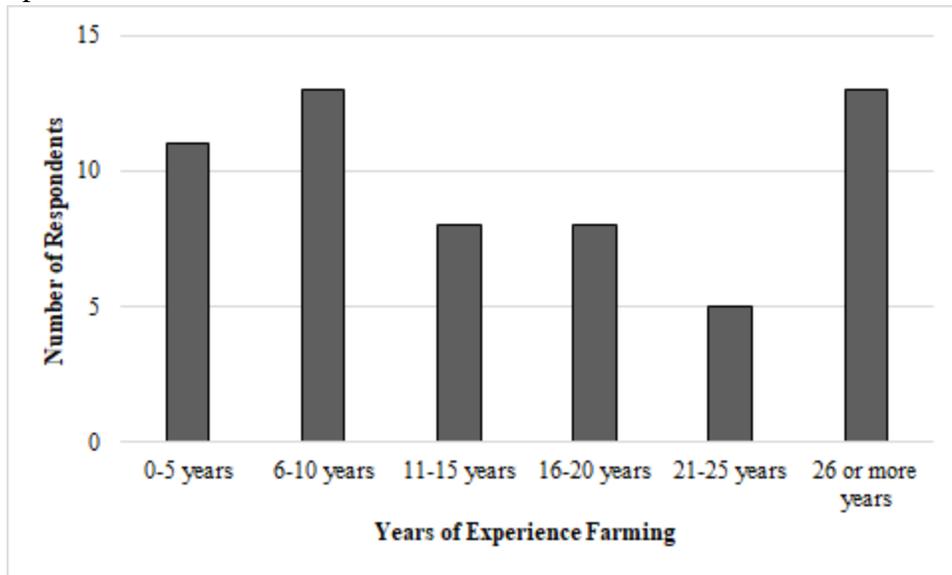


Figure 1. Years of experience in farming from survey participants.

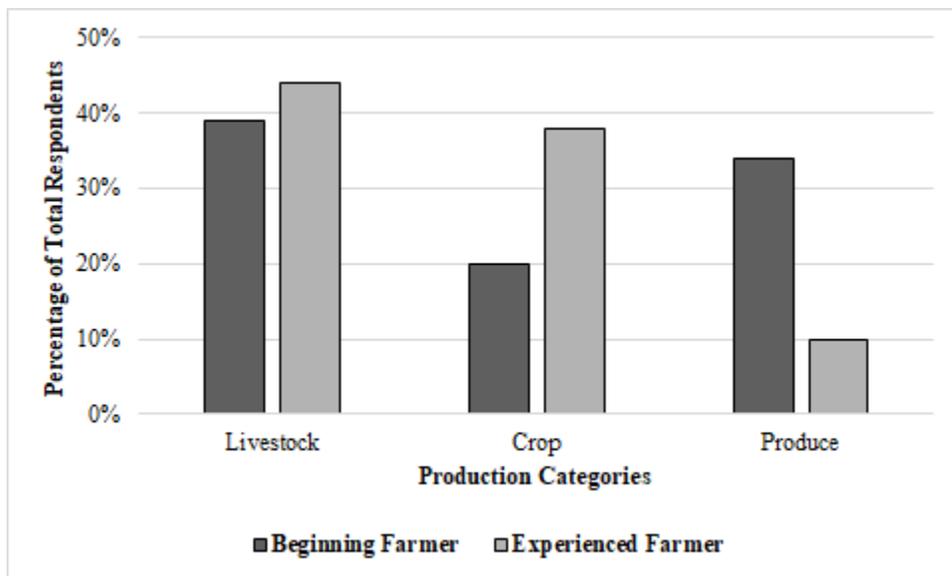


Figure 2. Types of agricultural operations represented by respondents of the Farmer Questionnaire.

Respondents reported rankings for some survey questions to represent the degree to which they felt areas of risk were important (Figure 3). A chi-square test of independence showed that there was no significant association between years of farming experience and perception of the importance of the following categories: Publicity and Retail Skills, Governmental Policies and Regulations, Production Knowledge, Employee and Management Skills, Legal Obligations and Risk. However, there was a difference in the way beginning and experienced farmers perceived the importance of Financial Skills. Results from T-tests revealed that there were no differences in average survey responses when survey data responses of experienced farmers and beginning farmers were compared (all $p > .05$).

The questionnaire allowed respondents to provide open-ended responses when asked what they wished they knew they began farming and what advice they would have for beginning farmers. Responses were then categorized into themes for reporting purposes, with some respondents providing more than one answer. Respondents reported wishing they knew more information regarding financial record keeping and production methods and case study reports from other farmers (Figure 4). Responses for this question included: how to get funding for projects, the importance of getting everything in writing when family is involved, and that there is always more to learn. When asked what advice respondents have for beginning farmers, answers were categorized as encouragement, financial and record-keeping, connection with a community, and access outside resources (Figure 5). Respondents were varied and specific in their advice to beginning farmers. One respondent reminded beginning farmers to pray and always carry a knife. Another respondent advised beginning farmers to invest in a therapist for

themselves and their marriage. Most answers sent encouragement to beginning farmers and recommended they would build connections with other members of the agricultural community.

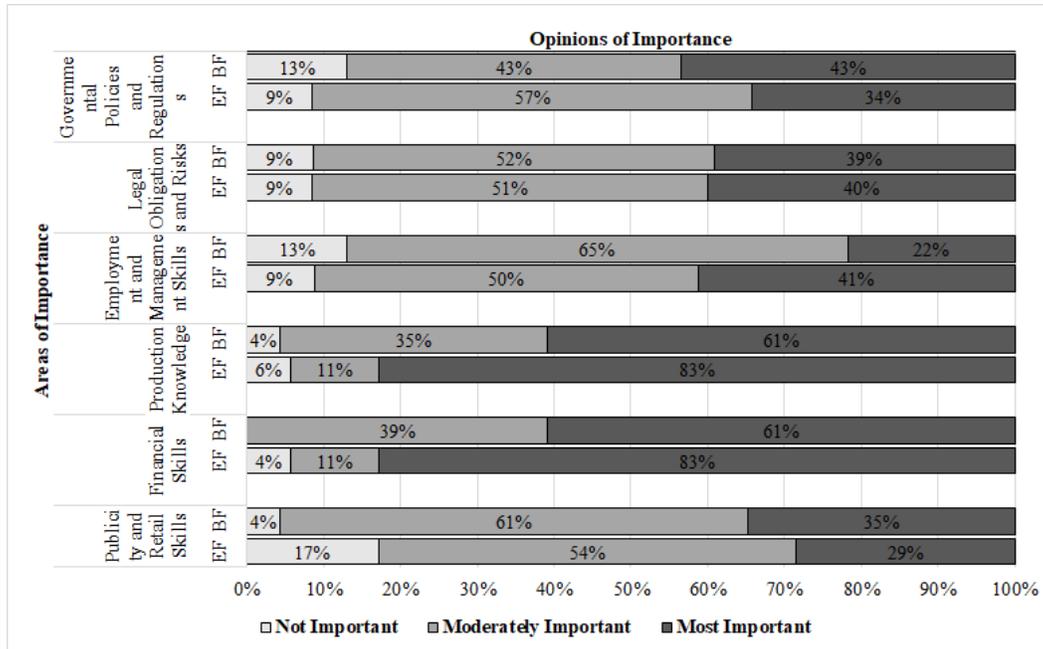


Figure 3. The results of the placing of importance of six key areas in farming by beginning and experienced farmers.

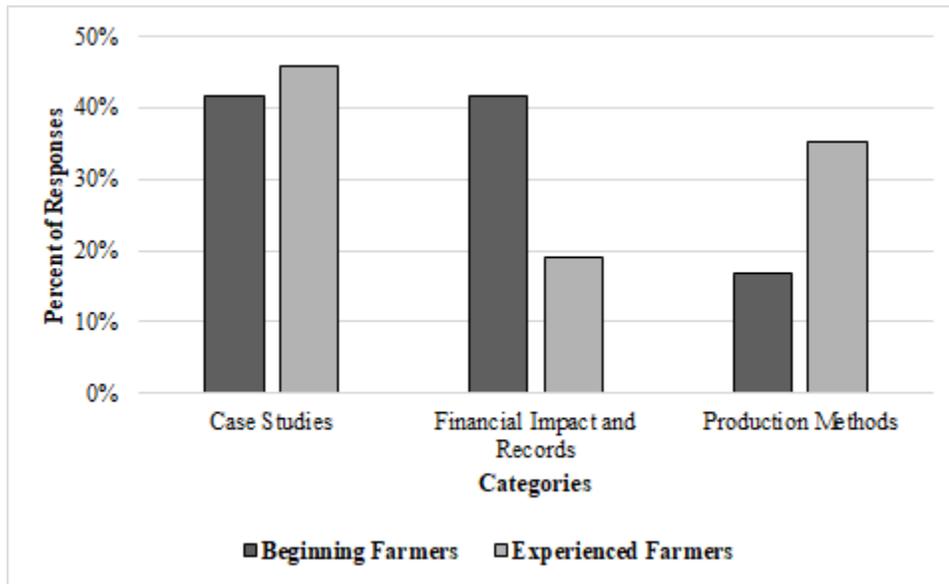


Figure 4. Categorized responses to the open ended question “What did you wish you knew before you began farming?”

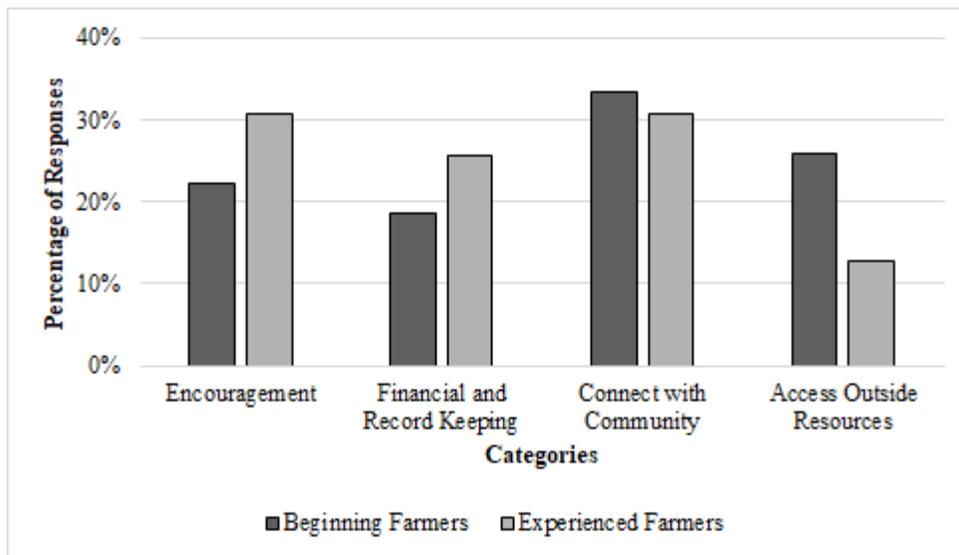


Figure 5. Categorized advice from the open ended question “What advice would you give to beginning farmers?”

IV. Discussion

Efforts to solicit information using this survey garnered responses from farmers in many states and areas of production who represented both beginning and experienced farmers. There were only fifty-eight total responses and more responses would have made this study stronger. Future surveys could be made available for longer periods of time, could employ marketing strategies available on Facebook and other social media platforms to increase responses.

Respondents answers to ranked questions implies that in most areas of risk, an individual's perception of importance of the various criteria were relatively similar. This may mean that beginning farmers have a good sense of where they should focus their efforts. Reasons for beginning farmers failures range drastically but lack of access to important educational resources remains an important factor. There was a small discrepancy where beginning farmers undervalued the importance of financial skills compared to experienced farmers. However, this difference and some emerging trends in other areas would be clearer with a larger sample size.

The types of answers provided for the open-ended questions varied greatly. This is likely due to the vastly different human experience and the fact that these questions allowed for personal responses. Despite the variety of answers, major themes did emerge which circled around topics of insufficient education. Many of the remaining answers focused were of a personal persuasion and reflect the human dimension of agriculture.

In this study, we did not clearly elucidate a list of unserved educational topics, in part, due to a small sample size and short study period. We did show the ubiquitous desire and regard for education as a key factor in the success of beginning farmers. Moreover, the information we were able to collect showed the perception of the importance of access to educational resources to farmers of all experience levels. The farmers surveyed through the Farmer and Rancher

Questionnaire run diversified agricultural operations and experienced and beginning farmers report having similar concerns. As beginning farmers transition into experienced farmers, the available resources need to also evolve to maintain relevance to the next generation of farmers.

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Appendix A: Farmer Questionnaire

1. ELECTRONIC CONSENT: Please select your choice below. Clicking on the "agree" button below indicates that: you have read the above information, you voluntarily agree to participate, and you are at least 18 years of age. If you do not wish to participate in the research study, please decline participation by clicking on the "disagree" button and exit this survey.
 - a. Agree
 - b. Disagree

2. Please indicate the type of agricultural operation you or your family are involved in. Check all that apply.
 - a. Crop
 - b. Produce
 - c. Livestock
 - d. Aquaculture
 - e. Horticulture
 - f. Other

3. Please provide a brief description of the agricultural operation you indicated above.

4. Does your operation have a website, newsletter or social media account? If yes, please check all that apply.
 - a. Website
 - b. Newsletter
 - c. Facebook
 - d. Instagram
 - e. Twitter
 - f. Not Applicable
 - g. Other:

5. How long have you been involved in farming?
 - a. Not currently farming
 - b. 0-5 years
 - c. 6-10 years

- d. 11-15 years
 - e. 16-20 years
 - f. 21-25 years
 - g. 26 or more years
6. Please rank the following as Not Important, Moderately Important, and Most Important.
- a. Publicity and Retail Skills
 - b. Financial Skills
 - c. Production Knowledge
 - d. Employee and Management Skills
 - e. Legal Obligations and Risks
 - f. Governmental Policies and Regulations
7. Please explain why you chose to indicate the areas as Most Important from the list above. Are there any other areas which you would consider to be important?
8. What is one thing you wish you had known when you first began farming?
9. What advice would you give to beginning farmers?
10. Are you willing to be contacted for further questioning?
- a. Yes
 - b. No
11. Please provide your Name, State, Email Address, and Phone Number, if you are willing to be contacted for further questioning. If you would not like to be contacted in the future, please skip this question, and click done.