PSG-FAIMER Regional Institute

ML Web Assignment Report

Preparing online discussion on 'Analysis of data' for Medical Educators of South Asia: A PSG-FRI Experience

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PSG-FAIMER ML Web Assignment, October 2009 Report

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Ranjana and Sairu (2009 PSG-FRI Fellows)
Thomas and Saira (PSG-FRI Faculty)

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1. Introduction

The PSG Institute of Medical Sciences and Research (PSG-IMSR) is the youngest FAIMER Regional Initiative (FRI) center in India established in 2007. As the FRI is modeled on the FAIMER Institute, new batch of fellows are selected from those who apply on-line to the FRIs. The application is critically reviewed by medical educators who are familiar with the FAIMER fellowship program. The on-line application is accompanied by two important support documents: confidentially report and recommendation, which are typically filled by the Dean and Administrative head of the fellow's institution. The applicants provide detailed on-line curriculum vitae along with a concise note mentioning the main reasons for applying to the fellowship. Most importantly, the on-line application also contains the intended Curriculum Innovation Project (CIP) to be completed in the first year of the fellowship.

The CIP is one of the important factors for selection into the FAIMER fellowship program. Thus, FAIMER fellows are also required to carry out their CIP and furnish its progress updates every 3-6 months to the associated FRIs. These CIPs contain a robust methodological section where fellows need to use simple to sophisticated quantitative and qualitative data analysis tools and techniques to achieve their objectives.

Following the FAIMER Institute's legacy, the successful FRI fellows attend two residential contact (on-site) sessions and they are also required to engage in an intensive monthly on-line discussion (distance learning) sessions known as Mentoring and Learning (M-L) Web (off-site) program through controlled mass e-mailing system known as listserve to get in touch with each other. Further, the first year fellows need to summarize the monthly discussion or ML-Web Intersession Assignment whereas second year fellows are required to write an independent 'Scholarly Report' on the monthly medical education theme as a requirement for the fellowship certificate. This report is an example of such "Scholarly Report".

The duration and timing of the on-site and off-site program at FRIs are set where the first year fellows democratically choose the M-L Web discussion topics (themes) in their first on-site session that also marks the initiation of their fellowship. The second year fellows and FRI faculty are then allowed to sign up for the selected topics for the pre-assigned months. Typically two junior fellows are teamed up with two senior fellows and at least one faculty mentor for a month long discussion on various topics related to the medical education.

Planning for each topic/theme is done at first at the on-site session and later silently within the members of the pre-assigned month. A first year fellow from each group must post the detailed discussion plan including the detailed weekly and monthly learning objectives one week prior to the pre-assigned month. Furthermore, each week is moderated by one of the fellows and he/she is expected to submit a weekly summary in the on-line discussion forum. As the first on-site session for first year fellows focuses on the discussion and refinement of their CIPs, they often realize the strong need of data analysis tools and techniques: both quantitative and qualitative.

This has happened in the PSG-FRI in 2009 and thus first year fellows choose "Analysis of Data" as one of the M-L Web topics for the first time. Therefore, this report attempts to document the process leading to the selection of "Analysis of Data" and details of the on-site and off-site planning carried out for the effective M-L Web activity for "Analysis of Data" during October 2009 on PSG-FRI Listserve.

2. Methodology

The planning for the selected topics was done first at the on-site session and later in the off-site session. The agreed plan was executed afterwards in the assigned month.

A. On-site session planning

At the first on-site session, a brainstorming session was carried out to identify the most plausible M-L Web based distance learning topics from the first year fellows. This session was done few days before the re-entry of the second year fellows where the identified topics were listed in a flip-chart. Each first year fellow then selected the three most preferred themes and seven topics were selected based on the majority of choices.

After the monthly theme was selected, the preliminary planning for the each M-L Web session was carried out at the on-site session at PSG-FRI dividing the fellows and faculty into the small groups. These groups worked with the assigned monthly topic/theme and prepared a preliminary sketch of the M-L Web discussion. The group documented this process in the official FAIMER framework and handed it over to the PSG-FRI staffs with their names and signatures that were required for the fellowship certification. The fellows and faculty received a copy of this document for future reference.

B. Off-site planning

The off-site planning started from June 2009 onwards through e-mail exchanges. The planning process gained momentum from August 2009 when consolidation (planning/fine tuning) of the October 2009 discussion plan took place, however. The group discussed in details "Why 2009 fellows choose the Data Analysis as one of the M-L Web topic for October 2009?" The group brainstormed on this issue and also did content analysis of the Curriculum Innovation Projects (CIPs) of the fifteen 2009 fellows that submitted their updated CIPs by second week of September 2009.

The 2008 fellows also shared preliminary questionnaire on quantitative and qualitative data analysis. These questionnaires were intensely discussed and later agreed to post a modified versions on the first week and third week of October 2009 in order to prioritize the discussion topics that followed on the second and fourth week of the month on quantitative and qualitative data analysis respectively.

C. Data Analysis

All the 71 planning e-mails related to the "Analysis of Data" are filtered into a separate folder with respondents name and data. The text of the planning e-mails were then copied to the Microsoft® Word® 2007 and a 45 pages long description is created (Font: Times New Roman, Size = 12 and Single Spacing). This text data was analyzed using the content analysis technique. The italics texts in this report are the self-accounted verbatim taken directly from the e-mail. Content Analysis of the CIPs and calculation of the reliability (Cronbach's alpha) of MCQ items is done by using the MS® Excel® 2007.

3. Results

Figure 1 shows the distribution of 71 e-mails that were exchanged for planning the "Analysis of Data" for the month of October, 2009 in the PSG-FRI listserve i.e. distance learning platform. It shows the the most number of e-mails were sent by the second year fellows (Amol and Shital) followed by first year fellows (Sairu and Ranjana) and then the Faculty (Saira and Thomas). These e-mails are categoried as pre-planning, planning and post-planning e-mails. The planning e-mails were further divided into questionniare and learning arcs/objectives related e-mails.

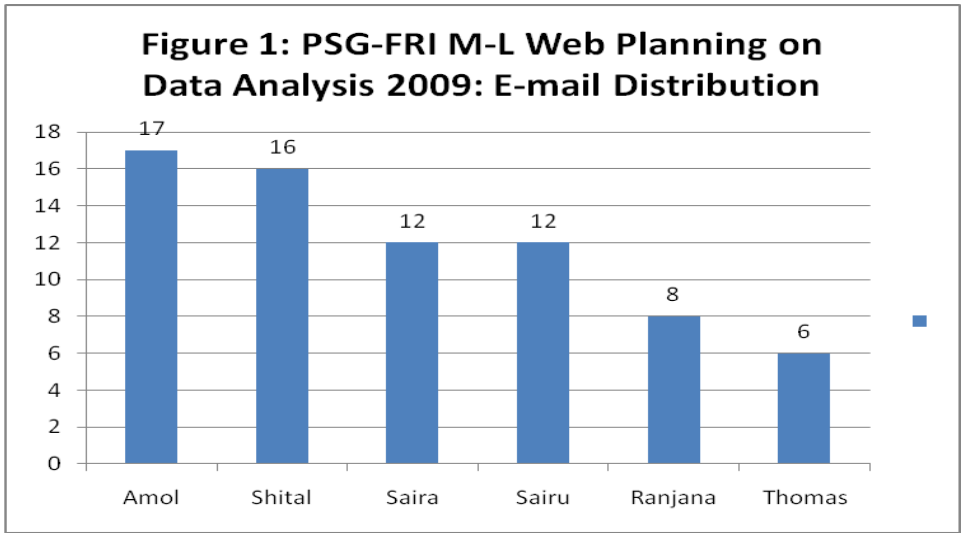
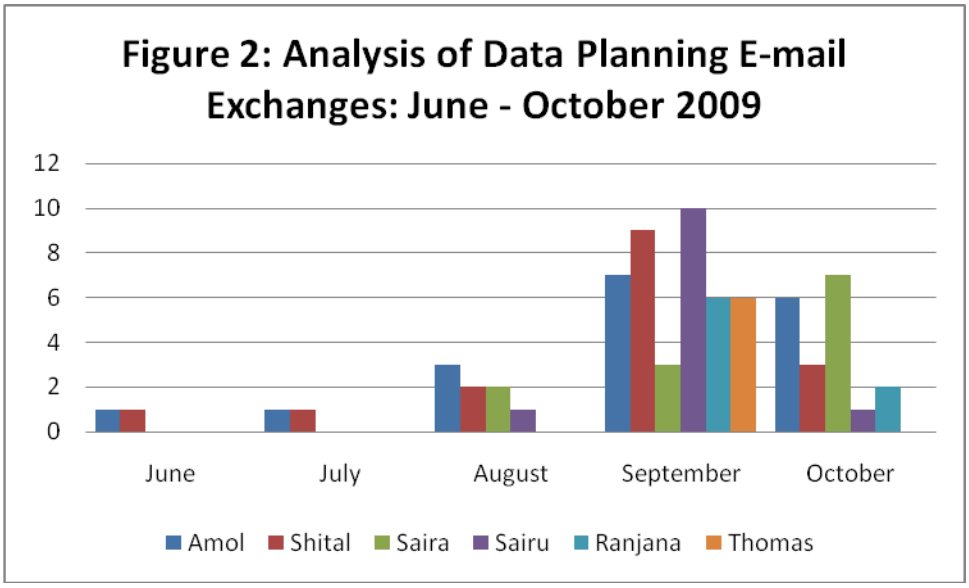


Figure 2 shows the monthly e-mail distribution of e-mails by fellows and faculty. Initially second year fellows worked silently to encourage each other to plan the October discussion and construction of the agreed questionnaires on quantitative and qualitative data analysis. They thought it would be easy to use SurveyMonkey® to collect the responses as it is easy tool to collect data through an on-line survey method. This pre-planning phase was not found effective as other group members were unaware about the planning. Thus, the planning process did not gather momentum until one of the assigned faculty (Saira) started an e-mail thread entitled **"October_Discussion_Data_Analysis: Give it cutting Edge"** on August 20, 2009 copying to six members of the group. This e-mail performed as a catalyst and provided a snow-ball effect among the fellows and faculty to effectively plan the "Analysis of Data" session at PSG-FRI listserve.



Saira argued that Data Analysis can be boring, dreary and intimidating for many and Sairu added that data analysis is a vast topic and many feel that it is a difficult terrain reserved for statisticians. Saira wanted the discussion to leave a mark that it can be the best part of our research - to crunch the numbers and make meaningful interpretations of them and also what a wealth of information qualitative data can actually be! Sairu, on the other hand, pointed out that the challenge would be to make it interesting and appealing in the context of medical education.

Amol, on the other hand, thought that the discussion is going to be vibrant and versatile and pointed out the need of SMART objectives related to commonly collected/natural occurring data in the field of medical education. Saira agreed that the framing the SMART objectives is a good way to start the discussion but she also reminded to put forth the questionnaire in mind to bounce it back and forth to collect appropriate data that in intended to collect. She requested the group to come up with strategy to make the October Discussion on Data Analysis, both fun and enriching for all concerned and Shital requested the 2009 fellows to take a lead and share the preliminary sketches with the group. Thomas added that he has noted a flurry of strategic pre-planning required and ESSENTIAL for any meaningful learning experience through the Mentor-Learner (M-L) web.

During the off-site planning the fellows and faculty discussed ‘why 2009 fellows choose the Data Analysis as M-L Web topic for October 2009?’ as Shital requested clarification from the group as he found it critical before moving further on the planning phase. Saira then informed that *the theme is chosen as it is in line with the andragogic principles i.e. adult learners' felt-needs who are searching out appropriate methods for analysis of their own curriculum innovation projects and who in day to day life guiding student research projects, Post-Graduation (PG) dissertations, churning out papers etc...* Thomas added that Saira has given answer to the “Why” and suggested to consider this month as a skill / capacity building learning experience that is relevant and useful to the 2009 Fellows engaged in doing projects who would be generating data which would need analysis.

Ranjana provided a detailed account of "why" she felt necessary to discuss on data analysis and argued that she has *seen most of the research going on in medical colleges - people do what they feel they should be doing, then after getting the data, give it to the statistician to analyse! The statistician gives a bundle of papers after applying all sorts of tests, and the medical researchers are again at a loss to make any sense of all the figures they now have with them. There is a big chaos if the statistician does not know the significance of what you are trying to assess and if you do not know the significance of the results obtained, how to interpret the values of the statistical tests. October team with experts in statistics as well as medical field like all of you will surely be able to clarify the concepts of the rest of us novices! I can contribute by exemplifying the level of our ignorance! As Shital said in an earlier mail, being experts in the field, you all may not realize to what extent you need to simplify, explain! I can make sure you make me understand! If I understand, I am sure everyone will also have understood! Then, may be, we will have achieved the goal of helping all the 2009 fellows draw meaningful conclusions from their research projects*. There was a silence from the group members indicating that they agree with Ranjan's viewpoint.

During the initial planning phase 2008 fellows and faculty found that the 2009 were keeping silence and decided to contact them through Short Message Service (SMS) and phone call. However, soon it is found that both the 2009 fellows were actually actively participating on the discussion but their e-mails were not reaching to all the group members. Thomas identified this problem when Sairu sent him e-mail saying that she has not been able to connect to the group and it was revealed that Sairu (and Ranjana) were using "reply" button of their e-mail rather than "reply all". The problem was quickly solved and all the group members actively involved the preparation dynamics of the M-L Web October Discussion on Data Analysis at PSG-FRI listserve.

In the middle of the planning phase, the preparatory e-mail exchange was posted on the PSG-FRI listserve and was also replied through the listserve. Shital noticed it and send caution notes to both the fellows through listserve. The PSG-FRI listserve administrator (Supten) reminded Shital to post the caution note and concern through private e-mail and NOT through listserve. Shital thanked Supten and followed his advice and was able to stop the breach. He also apologized to the two fellows who though the group e-mails for his ignorance of citing their mistake in the listserve.

A. Questionnaires

As per Saira and Thomas's suggestion, early part of the planning was concentrated heavily in the questionnaire development. Amol posted a detailed qualitative data analysis questionnaire that required going through number of qualitative analysis research papers to answer them. Sairu and Thomas reminded him and the group that the purpose of the questionnaire should be to assess the needs of the fellows rather than their knowledge. Shital also shared that it would be difficult to answer the questions without sufficient background on qualitative research. Amol was convinced and retracted the proposed questionnaire and started to work on the new one based on the group's suggestion. Thus, content validity was failed to establish in this context.

Shital also found difficulty to construct quantitative data analysis questionnaire and performed perusal of the updated September CIP reports of 2009 fellows in order to reveal the type of data that would be generated and type of analysis required by the fellows following the Thomas's suggestion. He posted the data and results of the content analysis of the CIPs with the group which revealed that the 2009 fellows have intended to use both quantitative (questionnaire design, basic concept of statistics, normal distribution, variables, scaling of variables, test of significance, Likert scale technique and psychometric item analysis) and qualitative analysis (analysis of feedback/opinion, content analysis, focus group discussion, assessment of student portfolios as well as role play and group discussion) in their CIPs.

It is decided to construct two questionnaires based on these findings to find the knowledge base and felt-needs of the fellows on the quantitative and qualitative data analysis. The surveys were planned to PRIORITISE which skill/competency they would like to be considered for a capacity building learning experience during the month. This information was used to design the learning objectives of the subsequent weeks so that their capacity is built up gradually.

Amol quickly used his expertise and found areas where fellows need guidance on qualitative data analysis. He posted an eight free format questions related to the qualitative data analysis (Annex I). This questionnaire was very much appreciated by the group and the content validity of the questionnaire was established.

Shital also constructed a crude questionnaire on quantitative data analysis and shared it with the group that consisted of 20 Multiple-Choice Questions (MCQs), Single Best Answer Type based on the content analysis of the CIPs. Thomas quickly responded and reminded that *the group have agreed for indulging in capacity building of the Fellows to enable them to do their own project data analysis, we could focus on those issues (mostly skills and to some extent basic applied knowledge)*. Shital argued that *those 20 MCQs were created after a detailed analysis of the "methods" section of the CIPs of the 2009 fellows where most of them intended to use the pre and post test evaluation. He was concerned about the sample size need and thus would also like to touch the parametric as well as non-parametric aspect of the paired data analysis. Thus, he had set the background with the "data scaling" and later with "data analysis" and thought that the first week moderator might set the discussion with this background. He also pointed out that a 2009 fellow has a comprehensive long list of OSCE item analysis thus he had also included some of those questions too. The ideal strategy is to expose (re-expose) the all the fellows on quantitative data analysis. He shared that he has not touched is the evaluation of self, peer and group using checklists and feedbacks. He informed the group that he is planning to use the "real" database to show how it can be done in the second week.* He also informed that he will soon share the methods and materials with them.

Thomas agreed and shared that as *Shital had thought through in the right direction but suggested to make it explicit at the beginning of the questionnaire the purpose of the survey, otherwise it may put off many people..... on first glance, the questions appear directed to students undergoing a course (nothing wrong in that, except faculty don't feel*

comfortable being treated as students). Shital promised to make sure that the questionnaire won't look like the one directed toward the students (i.e. faculty).

Ranjana shared that the questionnaire is good but wondered if the group is planning to explain / provide learning material for that which is found difficult by most of the fellows after answering. She again reinforced that the questionnaire is to be designed to identify the learning needs of the fellows and must serve that purpose. Saira was still unclear about the objective of the questionnaire and asked whether we are tipping into the peers' knowledge on what they know (What Shital has constructed) or are we looking at floating a survey (survey monkey kind) tapping in at what they feel they need to know?

Thus, there was not 100% consensus on the method chosen to assess the "felt needs" of the 2009 fellows in this case. However, Shital posted the result of the quantitative data analysis survey with clear explanations and it was appreciated well by the fellows and faculty (see Annex III). Particularly Saira has this to say:

"Kudos Shital! You have made learning fun and at the same time for those who have attempted, you have engaged their ***critical thinking skills*** *and helped them reason out their responses. And even if the response was incorrect now they know and as a result are* ***building their capacity*** *to make meaning out of data. All those who were intimidated will be less so after this exercise and will confidently and eagerly await your next step in this journey.*

Right on Shital! ***In character, in manner, in style, in all things (of your dynamic discussion), the supreme excellence is simplicity."*** *You are doing a fantastic job and as you rightly said Ranjana and Amol are waiting for their turns".*

Ranjana expressed the following regarding the qualitative data analysis:

Dear Shital, the program is Dr Amol's doing. He is really great, a real genius at Qualitative Analysis, with lots of experience & work in this field. It is a great relief to have experts like you two & Saira & Thomas Sir to support us through this daunting activity. I was really feeling verry jittery as October approached! The enthusiastic response from fellows in the first 2 weeks was heartening! The way you took all of us along on this difficult path was amazing! That again started mounting tension on me, a novice in this field. Interacting with Amol helped immensely to steady my nerves. I hope these 2 weeks go well! I am sure they will, with Amol and you all to back up!

Thomas expressed his happiness about the suggestions and questionnaire drafts being prepared and circulated for iteration among the planning group members. He reiterated that it shows the degree of commitment and the desire to make the M-L Web a learning experience for the fellows. *He also reminded that all these planning process must find a place in the scholarly report the 2008 fellows need to prepare so that it becomes a publishable (of interest to others/peers).*

Thomas also specifically mentioned the following regarding the proposed survey:

After you brainstorm about the items in the survey, you will then need to finalize it. While finalizing what gets finally included in the survey, the following criteria / guidelines need to be applied:

- *What is the purpose / objective of doing the survey? Is this item in the survey serving that purpose? If not, discard.*
- *If any particular objective/ purpose has not been addressed by any of the items suggested by the planning group, then construct one!*

These efforts will help us to achieve the next guideline given below:

- *Be brief (to reduce % of non-responders)*
- *Prepare a dummy table from the information / data that would emerge from the survey.*
- *Are they in consonance with the survey / study objectives / needs assessment?*
- *Keep up the good work and success (& usefulness to the target group) is assured!*

Shital requested the group to help him to reduce the number of items as Sairu has proposed to reduce it from 20 to 15/10. Sairu quickly responded with the reduced version i.e. 15 MCQs. Shital again went back to the content analysis of the CIP and was able to reduce it further to 10 items and created the same using a free account in the SurveyMonkey® on-line survey system and posted it on October 1, 2009 in the listserve (see Annex II). The reliability of these ten MCQs on quantitative data analysis is found to be 0.58 with 21 respondents which is quite less than the recommended value at least 0.8 and thus it is not recommended to repeat it in the present form in the small sample.

B. Learning Arcs, SMART Objectives

Sairu proposed the following macro learning arcs along with the moderators for each week for the months and requested each member to comment on it:

1st week - Quantitative Research Overview - Moderated by 2009 Fellow (Sairu)

2nd week - Quantitative data analysis methods - Moderated by 2008 Fellow (Shital)

3rd week - Qualitative data overview - Moderated by 2009 Fellow (Ranjana)

4th week - Qualitative data analysis methods - Moderated by 2008 Fellow (Amol)

The proposed learning arcs were in-line with the on-site planning but it proposed the roles the responsibilities of the 2008 and 2009 fellows clearly. Thomas reinforced and added that *as for any competency building, a week can be devoted to build the knowledge base related to that competency in the form of one or two select readings that requires the fellows to read and come up with comments related to its application to their project. Then in the subsequent week priming to the data analysis using simple secondary data (or their own project data). Or the usage of their own project data can be taken up in the subsequent week after discussion on their experience using the secondary data. We can*

then try to publish this On-line learning experience and so for this we will need to do all the relevant review of literature, detailed description of the process (Methodology), the output and outcomes...

Ranjana initially proposed to prepare a flow-chart on Data Analysis to be posted on the first week of October 2009 however later she shared a PowerPoint ® Presentation with 'where does your project data fit in?' dealing the basics in Quantitative Data Analysis. Unfortunately, this attachment was not discussed by the group as the proposed questionnaires may have covered most of them objectives on the presentation. On the other hand, it also revealed that fellows and faculty need continuous reminders on the relevant issues and processes amid the meticulous planning phase of the M-L Web discussion.

Saira expressed her happiness over the macro learning arcs and added that since our quest is to build up on our peers' existing knowledge (which she was sure is already huge!) and we are clear about addressing their felt-needs (give them what they need and will be able to use in their day to day professional life) always make it a point to trigger their curiosity and generate interest with discussion trading it off against posting too many resources. She was sure that the group is going to enjoy the learning experience as they moderate, brainstorm and mutually learn from each other.

The group unanimously agreed on the learning arcs proposed by Sairu and suggestions from Thomas. They also agreed to come out with the detailed planning where everyone felt that it should be based on the SMART objectives and requested Sairu and Ranjana to sketch the preliminary planning of the same basing it on their experience from the on-site training.

Ranjana quickly proposed a tentative five SMART objectives for the whole month that was related to:

1. Identify of type of data being generated through own research
2. Construct questionnaires that are easy to analyze and facilitate the analysis of open end questions
3. Guide fellows on commonly used software on quantitative and qualitative data analysis
4. Provide relevant study/resource materials to facilitate the learning
5. Make October discussion of "Data Analysis" useful to analyze CIPs.

Sairu posted a detailed plan for the whole month and asked for the critical review from the members to improve it further on September 21, 2009. She specifically asked the group to revise the objective and make it SMART objectives:

C. Weekly and Monthly Plans

First Week -Quantitative Research Overview moderated by **Dr.Sairu**

Specific objectives

- discuss the two types of variables (continuous and discrete) with examples **- <u>day 1</u>**
- identify the types of scale –nominal, ordinal, ratio and interval scales with examples **- <u>day 2</u>**
- discuss the different study designs with examples
  - -crosssectional
  - -case control
  - -cohort
  - -interventional **- <u>day3&4</u>**
- Getting acquainted with the data-summarisation of continuous and discrete data in graphs and tables **- <u>day 5</u> <u>&6</u>**
- ***Participants identify from their own projects the types of variables, scales and study design and how to graphically present the data (flow chart to be prepared by Dr. Ranjana)*** **<u>- day 7</u>**

Second Week- Quantitative data analysis methods moderated by **Dr. Shital**

- **data scaling, item analysis & paired data analysis**

<u>Making sense of the data from quantitative studies</u>

- Ensure results are valid
  (Errors and bias- selection bias, information bias, confounders, assessment of error inherent in a test or instrument (sensitivity and specificity) etc.)
- Describing results for discrete data (rate or proportion) & continuous data (mean) with no comparisons

<u>Approaches to statistical analysis</u>

- Statistical tests for comparing discrete variables between two groups – chi square
- Statistical tests relevant for continuous measures-compared across two or more groups
- Statistical tests relevant for continuous measure- association between two measures - correlation
- Statistical tests that consider comparisons while controlling for other variables? Stratification, standardization etc.(if required).

<u>(The participants with quantitative data should now understand the statistical test to be used)</u>.

Third Week- Qualitative research overview moderated by **Dr. Ranjana (4days)**

- The salient differences of qualitative research from quantitative research.

- Things to remember while preparing questionnaire
- Methods in qualitative study – indepth interview, -Participant observation

Third Week (5th & 6th days**) & Fourth Week - Qualitative data analysis methods** by **Dr. Amol**

- Methods in qualitative study –Focus group discussion
    - -snowball technique
    - other methods relevant to medical education
- Making sense of qualitative data – analysis- CONTENT ANALYSIS, ANALYSIS OF STUDENT FEEDBACK, ROLEPLAY& GROUP DISCUSSION ,ASSESSMENT OF PORTFOLIOS.
    - -Data cleaning
    - -Transcript
    - -Free listing
    - -Coding
- The participants to identify the qualitative data in their own project and LEARN how to analyse the same

The group members agreed on this plan and no further suggestions and/or comments were provided.

Ranjana posted a detail planning of the third and fourth week and requested to review and provide suggestions on the same. The plan was designed with the following Objectives, prompted by the analysis of the survey results:

1) To built the positive attitude for qualitative research
2) Share types of Qualitative Research Methods
3) Sensitize for basic analytic steps of qualitative data analysis

Day 1:

Posting the following outline of 2 wks activity:

First week: Overview of qualitative methods

1. Findings of the survey, Define Scope of the discussion based on the findings. (We will post the results)
2. Introduction to Qualitative Research, Importance of qualitative research.
3. An interesting small film. Please see, reflect and post your observations / reactions / reflections. (We will post a small film which brings out the importance of the right attitude for getting good Qualitative data)
4. Types of qualitative research methods. (With the help of photographs)

Second week: 7 steps of qualitative data analysis (One step each day)

Final Activity: Feedback from Fellows, Pointers / attachments / links to learning resources, books, etc. The group members agreed on the plan.

During the preparation phase, Thomas shared that a Nepali fellow in the CMC-FRI, Ludhiana used YouTube® to show step-by-step process of data analysis in computer and requested the group to explore further on it. Sairu and Amol found it intersecting proposition but other group members remained silent on this issue and it was not materialized in the October discussion on "Analysis of Data". Similarly, it was also proposed to construct a tool to assess the capacity of the fellows before and after the month long discussion on "Data Analysis" but it was also not discussed further and thus not materialized like the YouTube® proposition despite being very good propositions.

D. Post-Planning

The 2009 fellows were found to be nervous and unsure about the timing and their role as the moderators. However, the 2008 fellows and faculty continuously wrote them private e-mails giving the clues and tricks inherited from their own experiences and encouraged them to indulge in the rich experience. The 2008 fellows also wrote private e-mails to the fellows requesting to fill out both the questionnaires: a strategy proven to increase the response rate in distance learning situation. Saira was instrumental throughout the planning phase with her encouraging and relaxing notes which Ranjana found "moral support".

4. Discussion

The Educational Commission for Foreign Medical Graduates (ECFMG), USA decided to establish a separate Foundation to maximize the available resources to promote excellence in international medical education and FAIMER was incorporated. FAIMER (Foundation for Advancement of International Medical Education and Research) aims at creating educational opportunities for medical educators and improving the dissemination of knowledge in medical education[1].

The FAIMER Institute, started in 2001, awards a two-year fellowship focused on educational leadership and methodology. It consists of two brief residential experiences in the US integrated with distance learning[2]. The International Fellowships in Medical Education (IFME) program is an advanced-level fellowship that funds selected graduates of the Institute to obtain a master's in medical education at academic institutions around the world. FAIMER has also begun to develop regional institutes known as FAIMER Regional Initiatives (FRI) in other parts of the world based on the principles embedded in the original FAIMER Institute[3].

PSG-FRI is the youngest FRI in India and the present report is based on the planning done for a month long online discussion between fellows and faculty on "Analysis of Data". At PSG-FRI, the on-site session is usually done on the month of April. Thus, the 2009 on-site session was done on April 18 - 24, 2009 and the second on-site session for the 2008 fellows was done on April 23-27, 2009 allowing two consecutive days of

overlap between these two groups. The on-site planning is done in these overlapping days and we found that on-site planning is "core" for the off-site planning. Thus, on-site planning should be used as an opportunity to plan the one month long M-L Web discussion in the FAIMER fellowship program. We also found that the on-site residential training courses provide required understanding and practical application to perform the job as planner, moderator and scholar for FAIMER fellows in their FAIMER fellowship program.

The planning of the M-L Web discussion on "Analysis of Data" clearly indicates that engagement of the all the members of the pre-assigned month (junior fellows, senior fellows and faculty) is the key to the successful and well planned online discussion. PSG-FRI has allowed the second year fellows to moderate the M-L Web discussion in 2009 which was not the case in the 2008 session where only the first year fellows used to moderate the month long session between them. This new change has helped to improve the learning experience of the M-L Web. The purpose and rationale behind the selection of the M-L Web discussion topic should be clarified among all the group members before moving into the further planning phase as it clearly points out the required direction and action needed for the effective planning. Furthermore, content analysis of the Curriculum Innovation Projects (CIP) is found to be essential for planning the month long intersession assignment session for topics like "Analysis of Data" but it may not be necessary for planning other relevant topics related to medical education. On the other hand, perusal of the updated CIPs might also be useful for other topics/themes chosen to discuss in the FAIMER listserves.

It is also noticed that the monthly M-L web discussion is now usually accompanied by the on-line surveys and ensuring the validity and reliability of these questionnaires are very important. This report found that there should be iterations of discussion and assessment of each item of the questionnaire to ensure at least the content validity. Moreover, proper psychometric analysis is also recommended to assess and ensure the reliability of the developed questionnaires to reveal its usefulness for further use and/or point out the limitation of the same.

5. Limitations

The planning process could face "hiccups" along the way as it is found that sometimes it is hindered by the unknown simple technical jargon/act such as failure to appreciate the difference between "reply" and "reply all" button while responding to the group through personal e-mail systems. This has led the confusion and causing panic among the group members during the planning process in our case.

Moreover, it is also wise to discuss the preparatory works ONLY among the group members through private e-mails. This it is recommended neither to diffuse nor to seek the responses on planning phase through listserve as it may cause unnecessary confusion and sure distractions among the fellows and faculty that are actively learning other topics/themes at that point of time. Thus, it is advised to educate the fellows on simple "technical terms" related to e-mail and internet when they come for their on-site session.

It is also observed that all the propositions put forth by the group member/s might not be feasible within the stipulated time and it is wise not to pursue the task that demands a lot of time and work. It is recommended to stick with clear and doable tasks that are not going to put huge pressure on the already crammed time of the fellows and faculty.

6. Conclusion

The key to the success of the M-L Web Intersession Assignment planning is the periodic encouragement and moral support from the faculty and fellow mentors which in turns ensures the meaningful and effective M-L Web discussion. Thus, senior fellows and faculty should take up their mentoring role seriously to mentor and encourage the junior fellows while preparing the month long distance learning discussion plan. The preparation and encouragements should continue even after the M-L Web is started as the junior fellows who do not have previous such experience normally finds it difficult to cope with their roles and responsibilities. It is advised to validate the questionnaire/survey to be used in the M-L Web discussion and also perform the proper psychometric analysis to calculate the reliability of the instrument used.

There are limitations in the planning phase and it is recommended not to try gratuitous ideas but to stick with the agreed plan that was devised during the on-site session and agreed by the group members afterwards. It is also recommended to keep close eyes on the group's e-mail postings as some important e-mails could not reach to the whole group that is critical for the planning and, sometimes the planning e-mails are posted in the listserve instead of the private group e-mails. One should be carefully point out the problem with constructive feedbacks rather than exposing the individual fellow/faculty on the listserve.

7. Acknowledgement

We would like to acknowledge all fellows and faculty who participated actively and passively in the "Analysis of Data" session but we dedicate this report to the 2009 PSG-FRI Fellows who selected the "Data Analysis" as the month long M-L Web session in its on-line discussion session on October 2009.

8. References:

1. Bosch AO (2008). Con los auspicious de ECFMG y FAIMER: Under the auspicious of ECFMG and FAIMER. Educ. Méd 11 (3): Editorial.
2. Norcini J, Burdick W and Morahan P (2005). The FAIMER Institute: creating international networks of medical educators. Medical Teacher 27 (3): 214 – 218.
3. Burdick WP, Moharan PS and Norcine JJ (2006). Slowing the brain drain:FAIMER education programs. Medical Teacher 28 (7): 631 – 634.

Annex I: Qualitative Data Analysis Final Questionnaire

Dear respondents,

Our team has done the content analysis of Curriculum Innovation Projects (CIP) of 2009 PSG-FAIMER fellows to find out emerging themes for discussion on analysis of qualitative data. We found that few fellows proposed to deal with qualitative data in the form of feedbacks/opinion, FGDs, portfolio reports and observations of group discussion and role plays in their CIP and plan to undertake its content analysis. Please respond **freely and elaborately** to the following questions**.** This will further facilitate our discussion on analysis of qualitative data.

1) Have you ever applied or propose to use qualitative research method in your previous or recent work setting (teaching/research)?

2) If yes, what were/are the reasons for its use?

3) If No, what were the reasons for not using it?

4) What were/are the barriers in the analysis of qualitative data?

5) Have you ever done computer-aided content analysis?

6) Are you comfortable in reporting findings of qualitative data?

7) Have you received formal training on analysis of qualitative data?

8) Any remark or request?

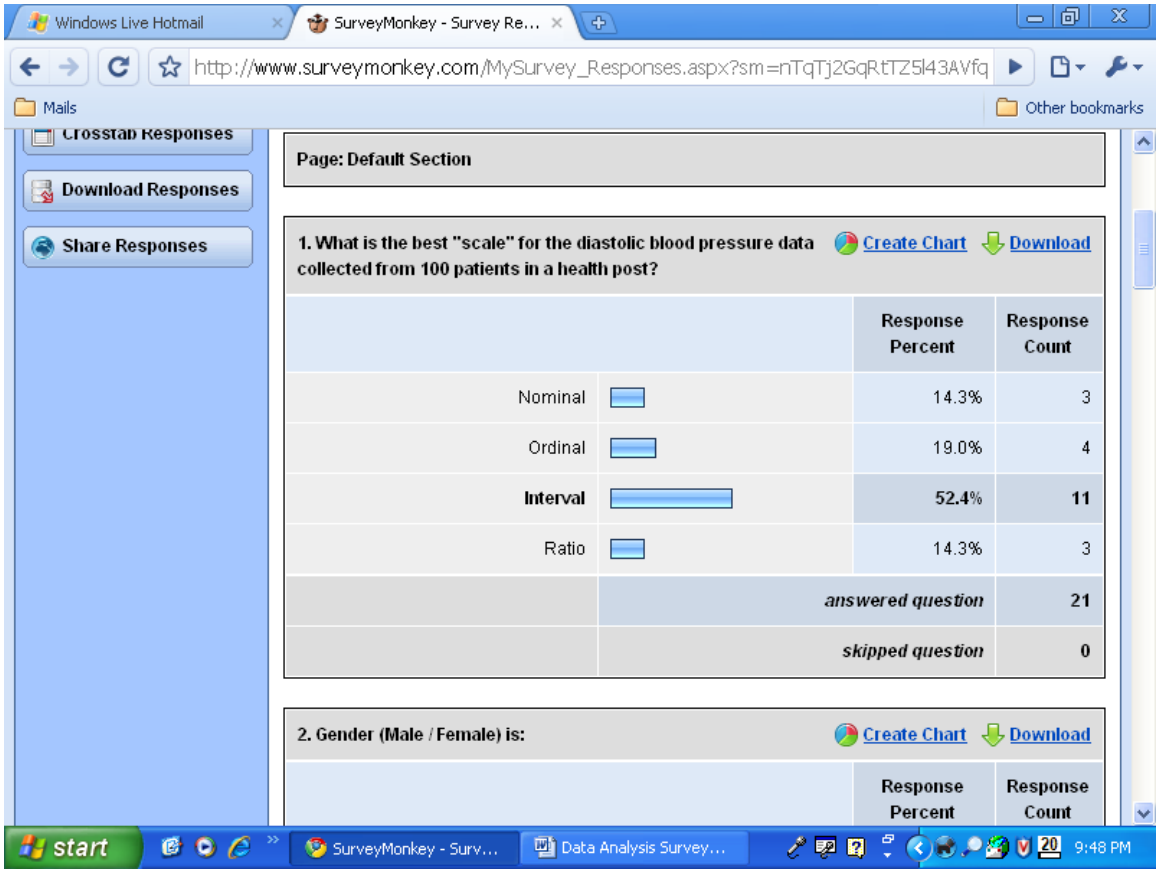
Annex II: Quantitative Data Analysis Final Questionnaire

1. What is the best "scale" for the diastolic blood pressure data collected from 100 patients in a health post?
   a. Nominal
   b. Ordinal
   c. Interval*
   d. Ratio
2. Gender (Male/Female) is:
   a. Nominal Scale*
   b. Ordinal Scale
   c. Interval Scale
   d. Ratio Scale
3. A 5 point Liker Scale is:
   e. Nominal Scale
   f. Ordinal Scale*
   g. Interval Scale
   h. Ratio Scale
4. Informally, normality of an interval or ratio scale variable is assessed by using following graphical tool:
   a. Histogram*
   b. Steam and Leaf Plot
   c. Cumulative Frequency Plot
   d. Box-and-Whisker Plot
5. Formally, normality of an interval or ratio scale variable is assessed by using following graphical tool:
   a. Histogram with normal curve
   b. Normal Quintile-Quintile (Q-Q) curve*
   c. Standardized Scatter Plot
   d. Line of best fit
6. Normality can also be assessed using:
   a. Fisher's exact test
   b. Shapiro-Wilk test*
   c. Student's t-test for independence
   d. Chi-square test of independence
7. The paired data sets fulfilling the normality conditions are tested using:
   a. Paired Z-test
   b. Paired t-test*
   c. Paired F-test
   d. Wilcoxon Signed Rank test
8. The internal consistency of the Liker Scale data is obtained by:
   a. Pearson's r
   b. Cronbach's alpha*
   c. Cohen's kappa
   d. Sommer's d

9. The inter-rater reliability among two-raters for same checklist is assessed by using:
    a. Intra-class correlation coefficient
    b. Cronbach's alpha
    c. Cohen's kappa
    d. Fleiss's kappa
10. The paired data sets fulfilling the normality conditions are tested using:
    a. Paired Z-test
    b. Paired t-test
    c. Paired F-test
    d. Wilcoxon Signed Rank test*

* indicates the correct answer.

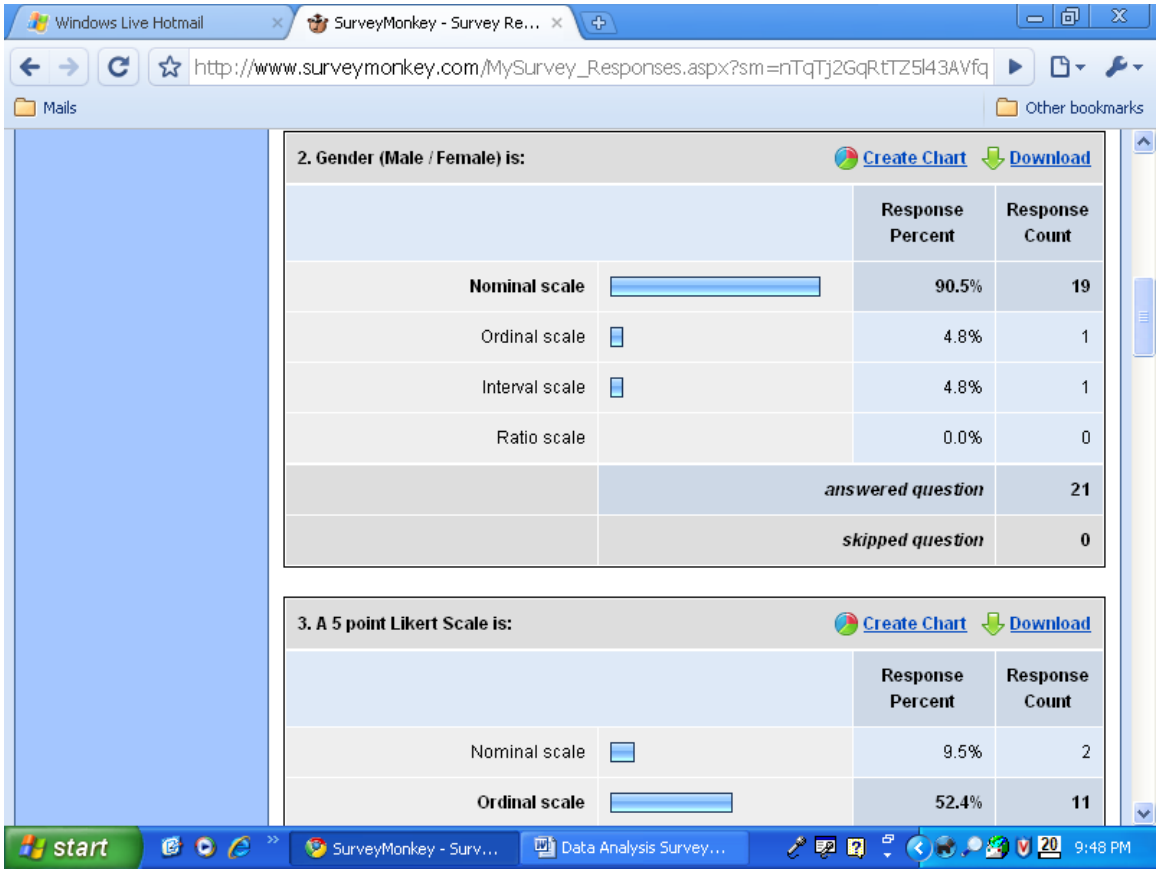
Annex IV: Quantitative Data Analysis "Need Assessment" Survey Results



The correct answer is Interval and 52.4% of the respondents have given the correct answer.

Explanation: Diastolic blood pressure is measured in terms of a continuous value like: 85, 89, 95, 99, 110 mm Hg etc and it does not have absolute zero for 100 "live" patients visiting the health post thus ruling out the ratio scale. It is neither nominal nor ordinal as the recorded diastolic blood pressure values are not categories.
When we have interval/ratio scale variable then we can compare its data distribution using suitable graphical methods like stem-and-leaf plot to have a glimpse of its data distribution. If this graphical tool shows a "bell shaped curve" then we can "informally" conclude that it follows the "normal/Gaussian" distribution. Histogram can also be used to assess the distribution of data but we need to plot frequency curve/polygon to compare it with normal curve. However, modern statistical software like SPSS can put theoretical normal distribution on the histogram. This in turn tells us whether we may or may not use the "parametric" tests with the given data. It is assumed that if the collected data follows the normal distribution then we can use the commonly used parametric tests are: z-test, t-test, F-test etc. Parametric tests are based on Mean and Standard Deviation of the data. For instance, when we compare diastolic blood pressure by gender (male/female) then we use z-test/ t-test where we compare mean DBP of these two categories.

Central Limit Theorem (CLT): It states that if you have more that 30 data points then it always follows (theoretical) normal distribution. However, we should take caution while using this theorem.

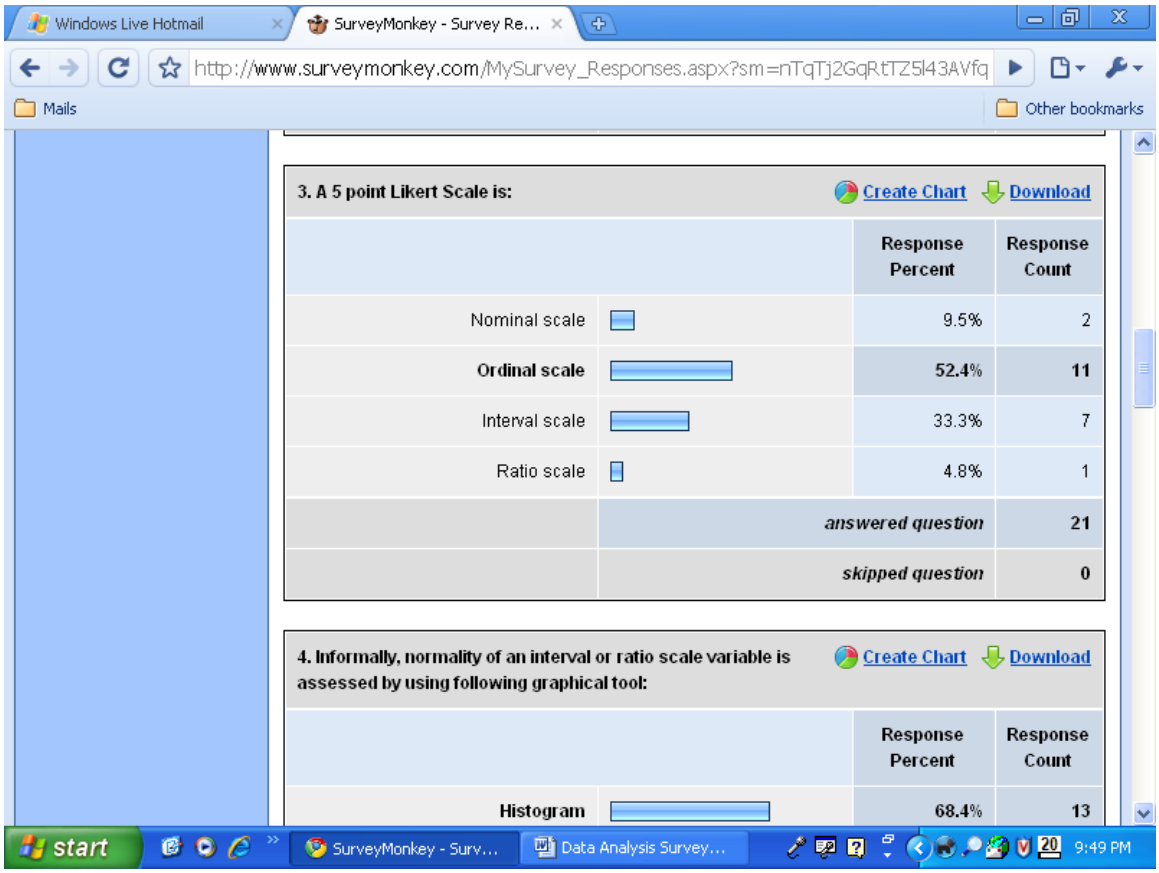


The correct answer is Nominal and 90.5% of the respondents have given the correct answer.

Explanation: Gender is a variable with only two categories i.e. Male OR Female and if we want to assign numerical code to this variable then it can be done in any order. For instance, we can code it:

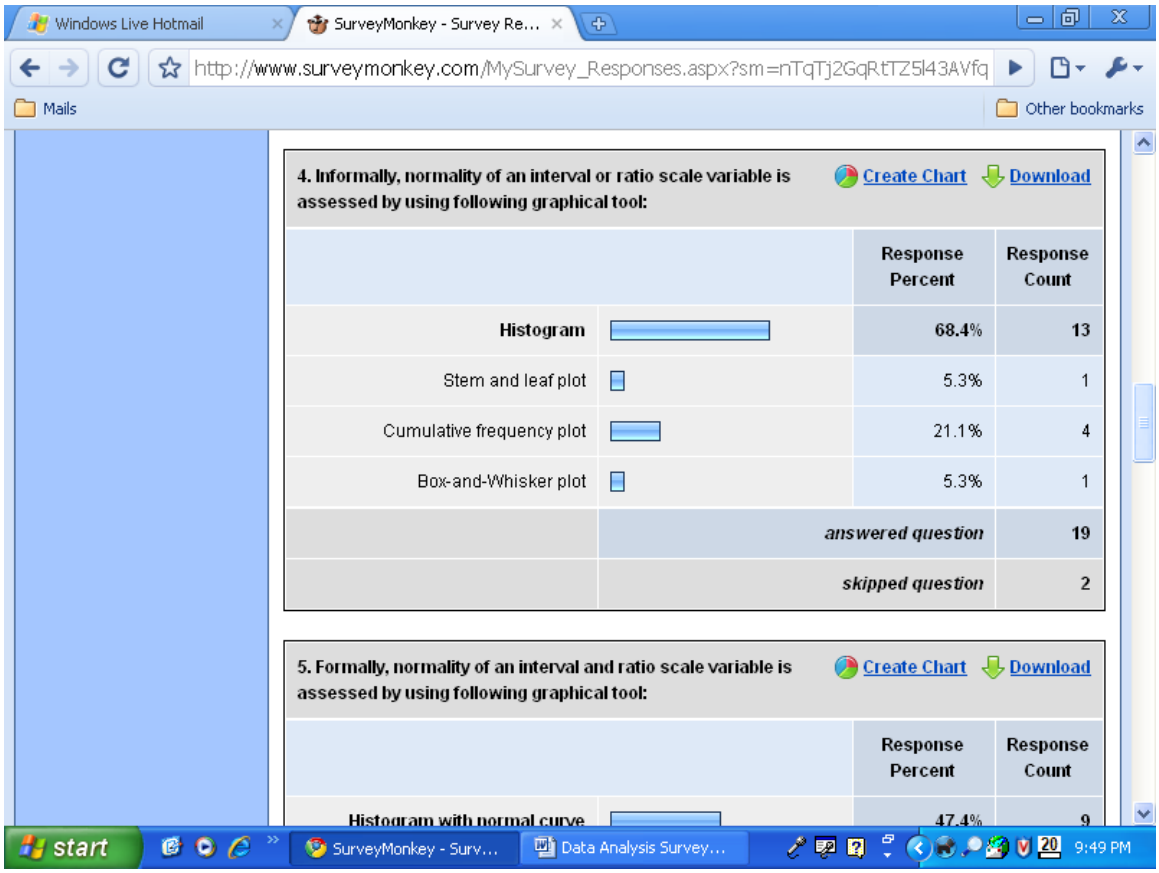
a. 1 – Male and 2 – Female
b. 0 – Female and 1 – Male etc

Thus, Gender is a categorical variable with nominal scaling. Let us consider that the 100 patients data in the health post also contain the diastolic blood pressure by gender. Let's further suppose that we have created a new variable (DBP2) based on diastolic blood pressure data of the 100 patients using 90 as "cut-off point" as indicated in the BMJ book "Statistics and Square One". Then DBP2 becomes "ordinal" variable as the lower (< 90 mm Hg) and higher (>= 90 mm Hg) categories has some ordered structure. Since we have one nominal (gender) and one ordinal (DBP2) variable, we can use contingency table (in this case 2 x 2 table) and associated tests (e.g. chi-square) for analysis.



The correct answer is Ordinal and 52.4% of the respondents have given the correct answer.

Explanation: Likert scale is a rating scale and rating scales are always ordinal. In other words, variables with rating scale and/or Likert scale always have ordinal scaling. The most commonly used Likert scale is the 5-point one (1 to 5) where 1 usually means strongly unfavorable to the concept and 5 means Strongly favorable to the concept. Although Median and Mode are recommended to summarize Ordinal scale variable, mean is also used frequently to summarize and draw inferences in case of Likert scale. Please visit: http://www.socialresearchmethods.net/kb/scalgen.php for more on scaling.
Likert scales are used heavily in the marketing survey but it is also becoming more and more common in educational research especially in the CIP of FAIMER fellows. It is very common to see the use of Likert scale to collect the opinion on particular issue. When Likert scales are used in a questionnaire then we should use the evidence based approach to finalize and analyze it. Normally, a questionnaire with Likert scale questions should be pre-tested and its internal consistency (reliability) should be thoroughly analyzed before the actual implementation. Internal consistency of the Likert scale data is calculated using the "Cronbach's Alpha". If the Cronbach's alpha is more than 0.7 then the questionnaire is considered as consistent. However, Cronbach's alpha less than 0.7 is also accepted due to the construct validity but its value less than 0.6 is not recommended. Please visit: http://www.childrens-mercy.org/stats/weblog2004/CronbachAlpha.asp.

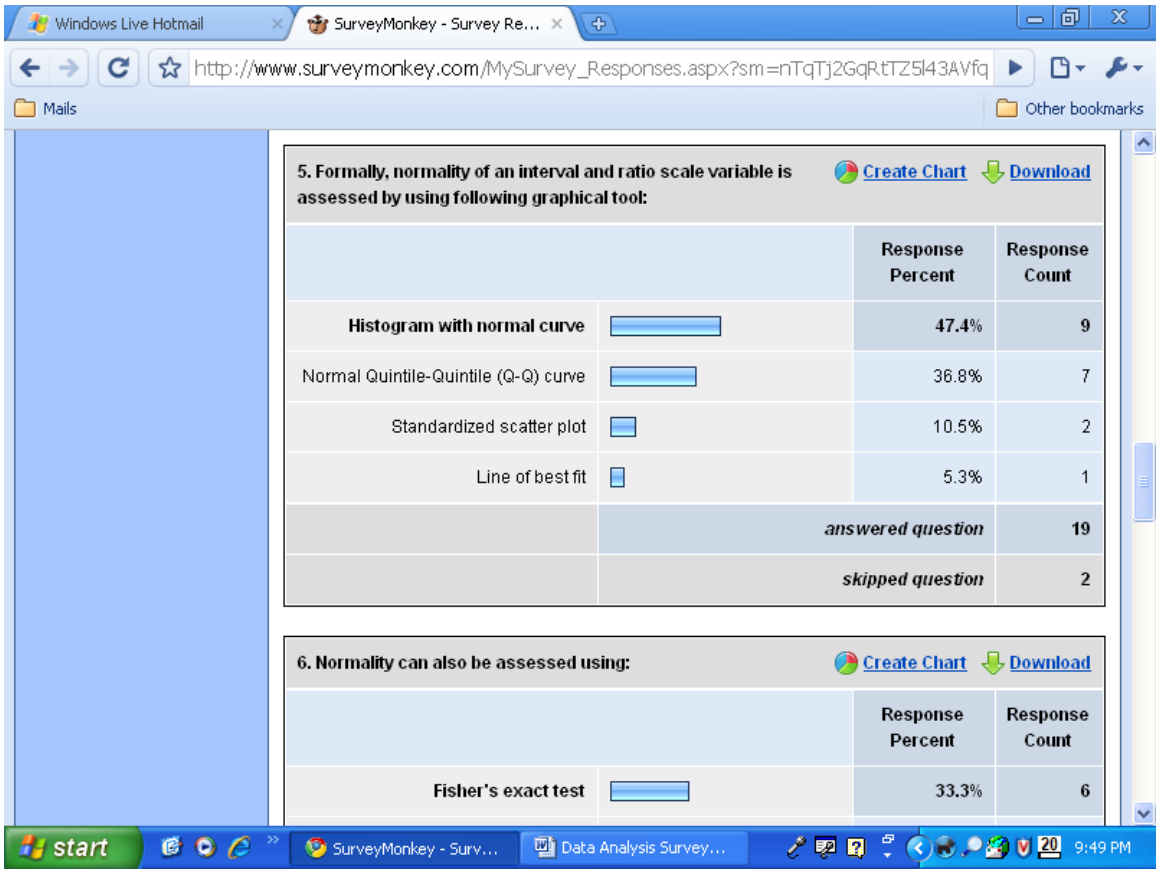


The correct answer is Histogram and 68.4% of 19 respondents have given the correct answer. Two respondents have skipped the question.

Explanation: Histogram is the most preferred method after the modern statistical software (like SPSS) can easily create and overlay the actual normal curve on it. Statistical software can also produce stem-and-leaf plot which I like most for assessing normality in the beginning. To assess the normality in Histogram manually, one need to draw frequency curve (free hand) or frequency polygon. Frequency curve/polygon is constructed by joining the mid-points of the upper side of the rectangles of the histograms. Please visit these sites to learn more on normal distribution and its tests:

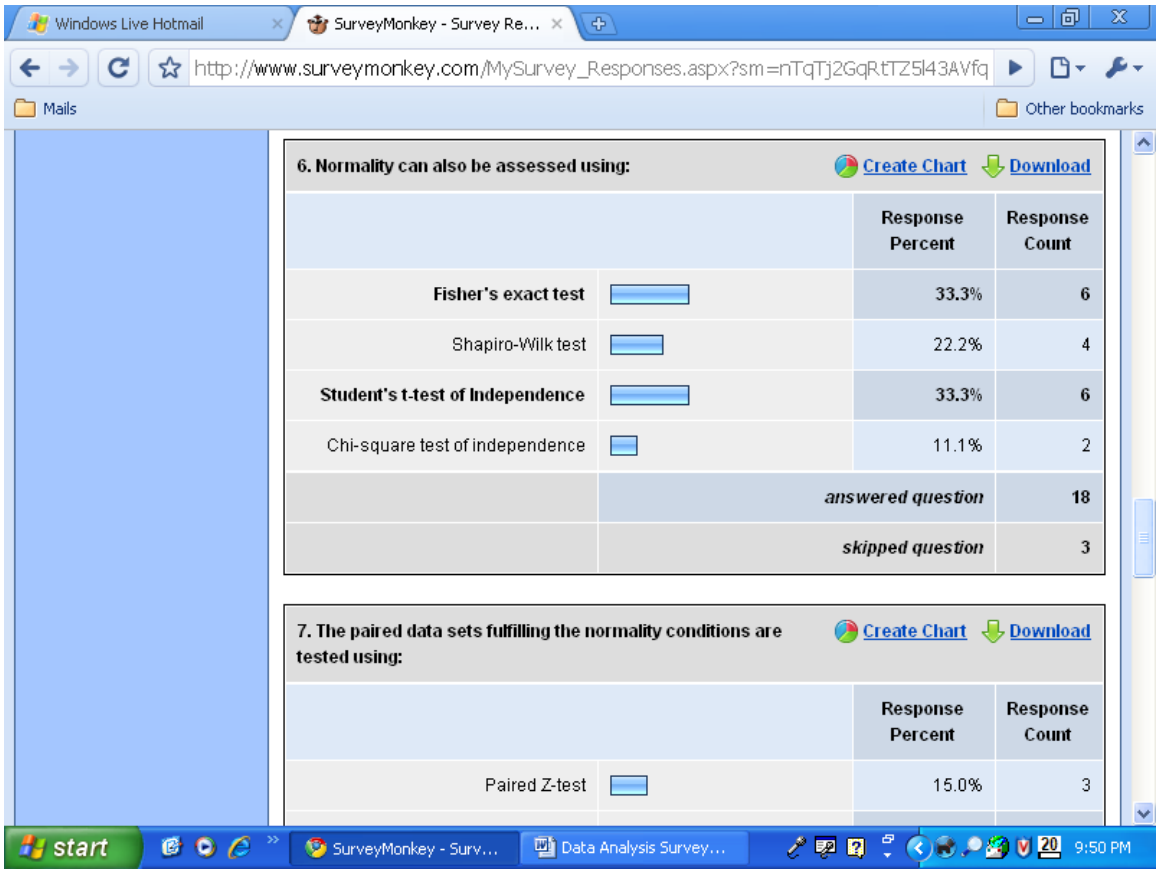
http://en.wikipedia.org/wiki/Normal_distribution
http://www-stat.stanford.edu/~naras/jsm/NormalDensity/NormalDensity.html
http://en.wikipedia.org/wiki/Normality_test

Cumulative frequency plots/ Ogives are used to locate the Median manually whereas the Box-and-Whisker plot or simply Box plot shows the 5-number summary i.e. two extreme values of data (maximum and minimum value and three quartiles (lower quartile, middle quartile and upper quartile). The middle quartile is also known as Median. It is also used to assess the existence of extreme values and outliers present in the data as the arithmetic mean is heavily influence heavily by these values. If the extreme values and outliers are not handled properly then the parametric tests (mostly based on arithmetic mean) give very biased results. Therefore, this type of informal assessment should be done before proceeding to the actual data analysis and drawing inferences.



The correct answer is Normal Q-Q curve and 36.8% of the 19 respondents have given the correct answer. Two respondents have skipped the question.

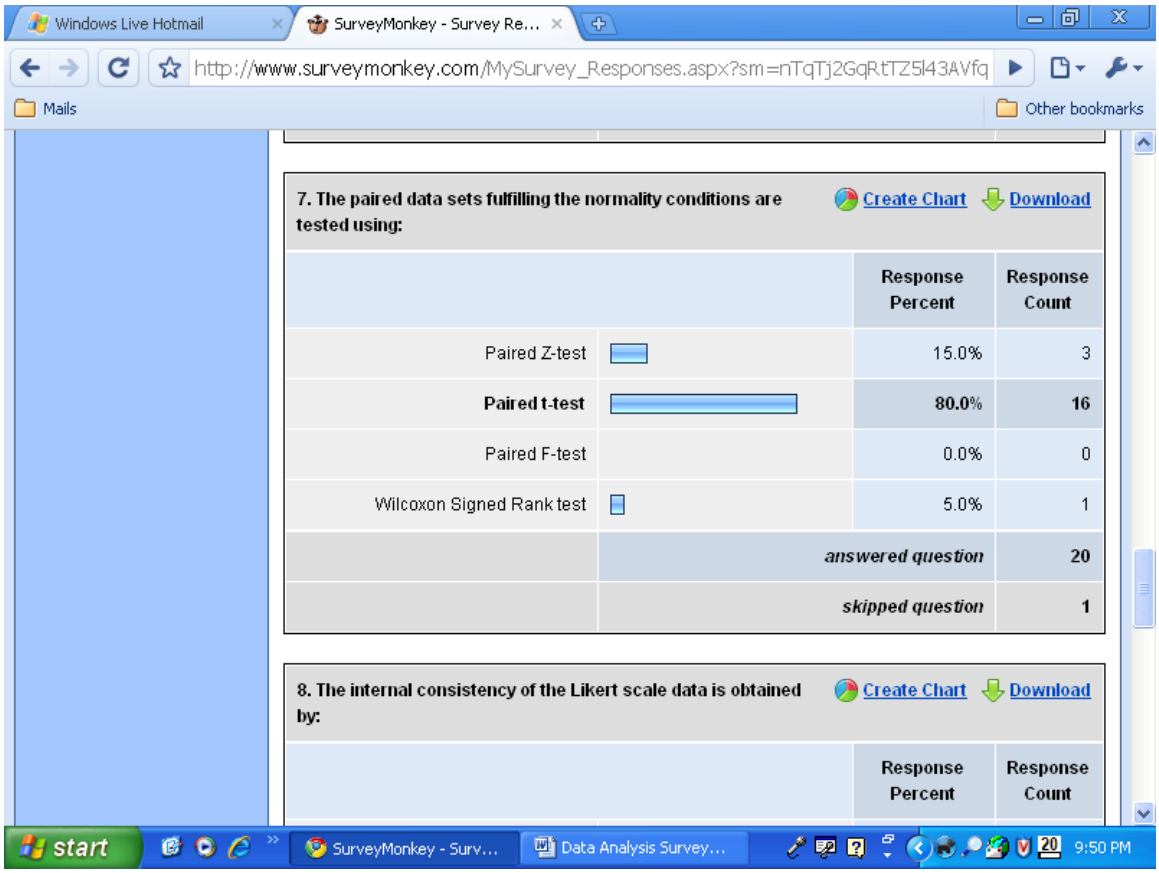
Explanation: Histogram with normal curve only gives an approximation and is an informal ways of assessing normality of data. The normal Q-Q plot, also known as normal probability plot is a quintile-quintile plot against the standard normal distribution. Here the correlation coefficient of the data (the goodness of fit of the best fit line) gives a measure of how well the data is modeled by a normal distribution.
These also have the benefit that outliers stick out, and that they can be used for communication with non-statisticians more easily than numbers (http://en.wikipedia.org/wiki/Normality_test).
It is very easy to ask for normal Q-Q plot in SPSS. Please visit this website for preliminary explanation: http://www.wellesley.edu/Psychology/Psych205/qqplot.html
We will construct our own normal Q-Q plot using the blood pressure data of 100 patients than I intend to post on October 10, 2009.



The correct answer is Shapiro-Wilk test and 22.2% of the 18 respondent's have given the correct answer. Three respondents have skipped the question.

Explanation: Although Chi-square test of goodness of fit can be used to assess the normality of the data, Fisher's exact test is used while analyzing 2 x 2 contingency tables. It is preferred choice in many epidemiological studies over the classical chi-square and corrected chi-square tests. Student's independed t-test itself assumes that the data is normal so we can not use this test to assess the normality of data. Chi-square test of independence is used to find whether attributes of two variables are independent or dependent with each other. Therefore, Shapiro-Wilk test is the only one in the given option used to assess whether the given data follows the normal distribution or not. We can use SPSS to get this test statistics and its associated p-value to predict whether the given set of data follows the normal distribution or not.

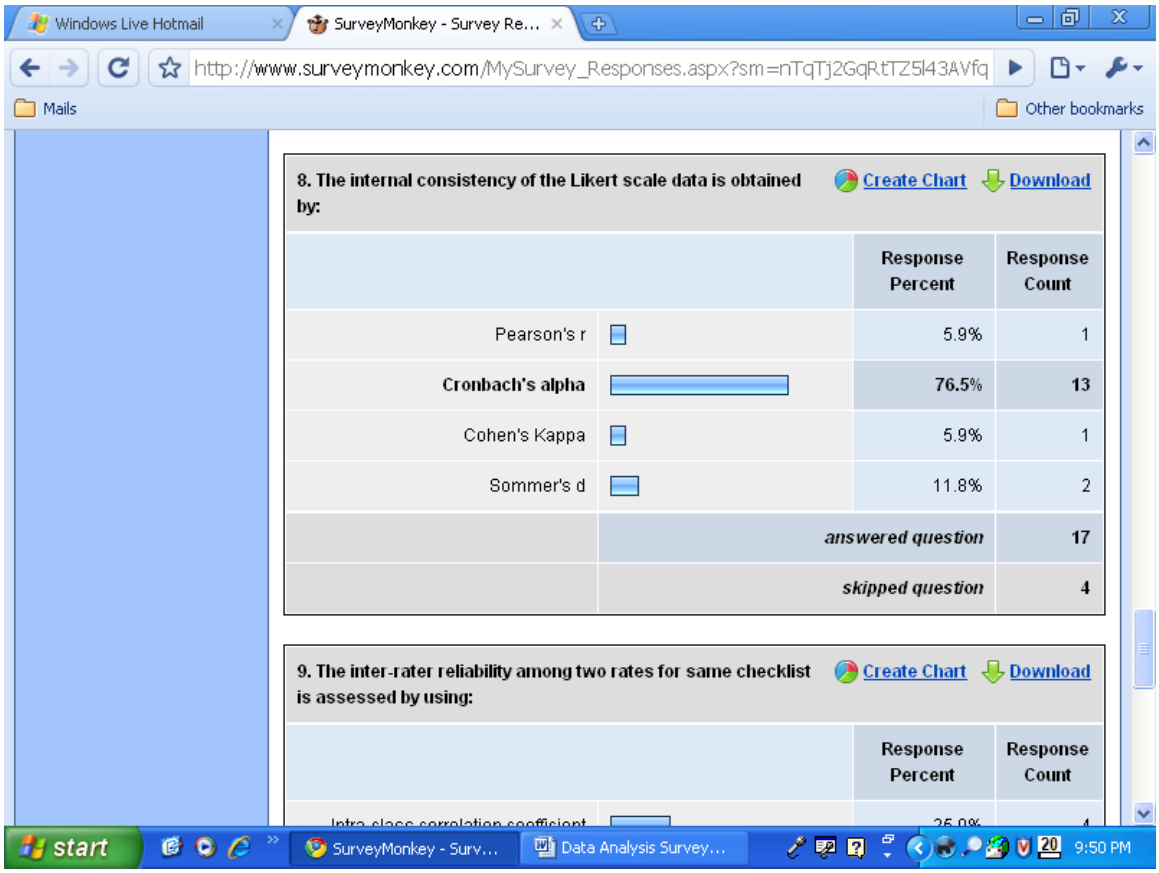
There are lots of statistics test available to assess whether the given set of data follows the normal distribution. In SPSS we can have Kolmogorov-Smrinov test (http://www.physics.csbsju.edu/stats/KS-test.html) with Lilliefore correction (http://en.wikipedia.org/wiki/Lilliefors_distribution) and Shapiro-Wilk test (http://en.wikipedia.org/wiki/Shapiro–Wilk_test). The Shapiro-Wilk test is preferred over the K-S test therefore we shall use this to test the normality. However, we should use this test with caution as it provides evidence for certain types of "non-normality" and it does not guarantee Normality: http://www.statsdirect.com/help/parametric_methods/swt.htm.



The correct answer is paired t-test and 80.% of the 20 respondent's have given the correct answer. One respondent has skipped the question.

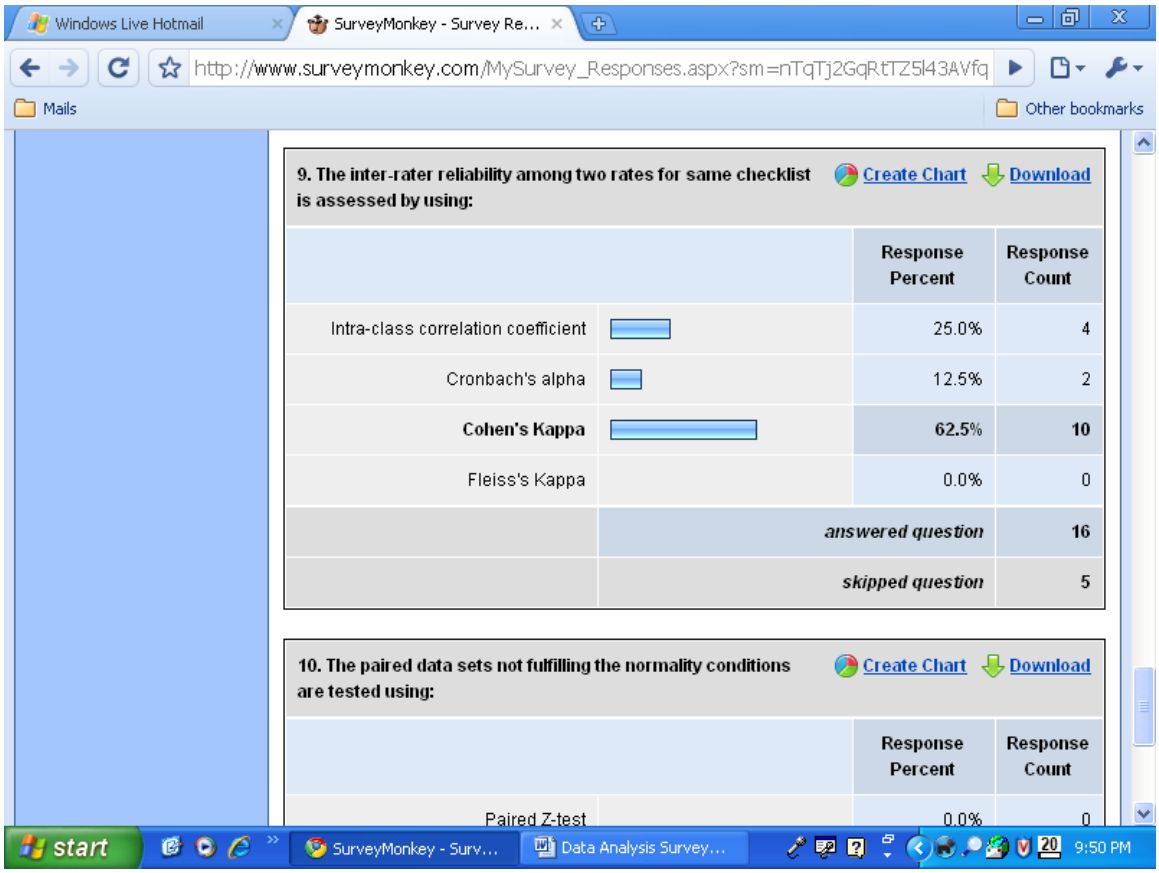
Explanation: When we have to test the pre and post test scores then we use paired t-test once we are sure that the difference between pre and post test scores follows the normal distribution. This test is used heavily in the program evaluation. For instance, if we want to perform an intervention e.g. lecture, workshop, small group and would like to know its effectiveness then a knowledge questionnaire is constructed and administered before and after such intervention. Once we get scores from before (pre) and after (post) tests then we calculate the difference between them and test for normality. If the difference is approximately normal then we can easily use the paired t-test. However, paired t-test is usually used even the sample size is small as we should avoid using this test if the difference is very non-normal (assessed via histogram). For more details please visit this sites:
http://udel.edu/~mcdonald/statpaired.html
http://www.graphpad.com/articles/interpret/Analyzing_two_groups/paired_t.htm
http://hsc.uwe.ac.uk/dataanalysis/quantInfDifPair.asp (examples from SPSS output is given)

When you have small paired data use this site to calculate paired t-test: http://www.physics.csbsju.edu/stats/Paired_t-test_NROW_form.html



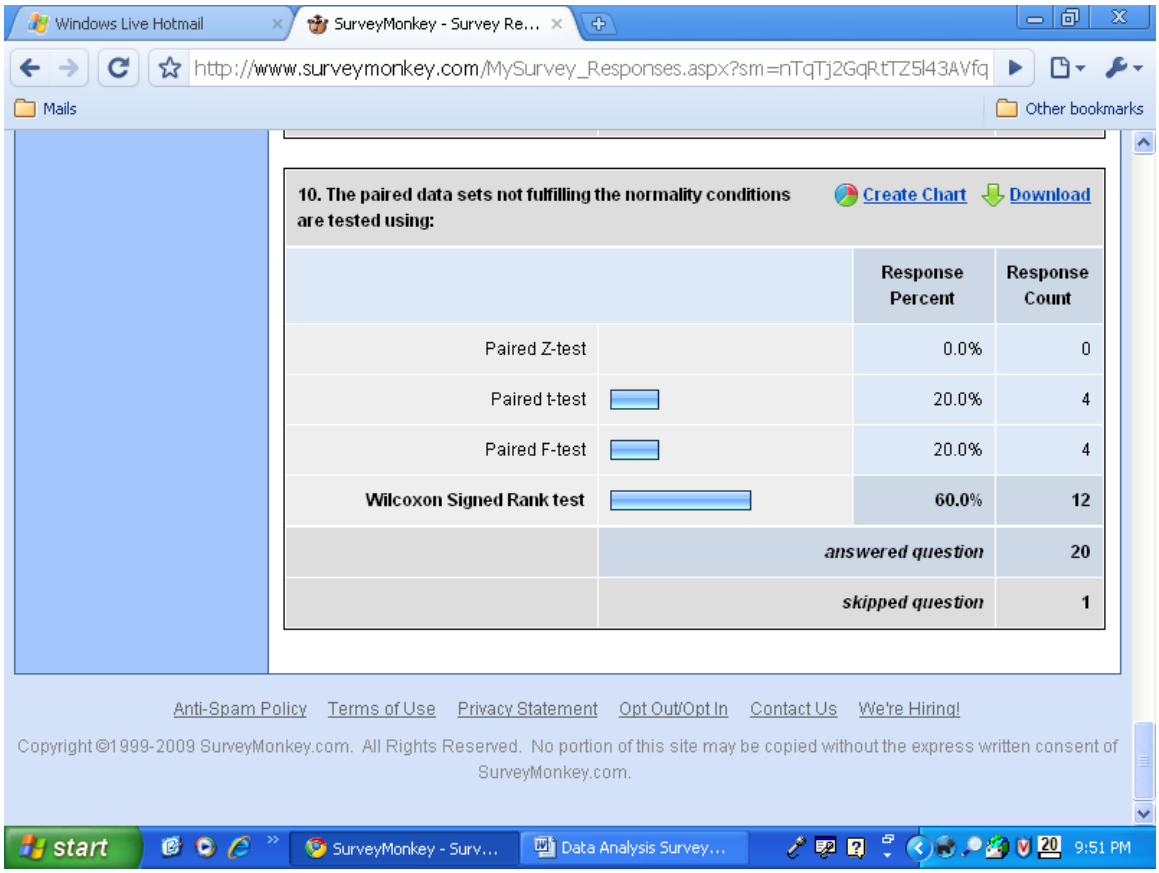
The correct answer is Cronbach's alpha and 76.5% of the respondent's have given the correct answer out of 17 who answered it.

Explanation: The internal consistency or reliability is calculated using Cronbach's alpha (http://www.joe.org/joe/1999april/tt3.php). It can be used for dichotomous/categorical as well and non-dichotomous (continuous) measures. For instance, we can calculate the reliability of a Multiple Choice Question using the Cronbach's alpha. Similarly we can calculate the reliability of Guttman and Likert scale using the same measurement. However, when we calculate Cronnbach's alpha in statistical software like SPSS for Guttman Scale data then the equivalent test is known as Kuder-Richardson Formula 20.
Cronbach's alpha details: http://en.wikipedia.org/wiki/Cronbach's_alpha
KR-20: http://en.wikipedia.org/wiki/Kuder-Richardson_Formula_20
Guttman Scale: http://en.wikipedia.org/wiki/Guttman_scale
For Complex Reliability estimation:
http://www.childrens-mercy.org/stats/model/reliability.asp
The following site clearly explains the use of Cronbach's alpha, factor analysis and correlation for four test items (q1, q2, q3 and q4) with what looks like 5-point Likert Scale for 60 cases (respondents). Please visit and have discussion in the listserive:
http://www.ats.ucla.edu/stat/Spss/faq/alpha.html



The correct answer is Cohen's Kappa and 62.5% of the respondent's have given the correct answer out of 16 who answered it.

Explanation: There are various types of reliability measurements suited for specific occasions. We need to calculate inter-rater or inter-observer reliability to assess the degree to which different raters/observers given consistent estimates of the same phenomenon. Furthermore, when there are only two observers in such situation then we use Cohen's Kappa to find the reliability (consitency) among these two rates. Likewise, when there are more than two raters then we need to use the Fleiss's Kappa.
The following site explains the various types of reliably with succinct examples. Thus, I request you all to visit it: http://www.socialresearchmethods.net/kb/reltypes.php



The correct answer is Wilcoxon Signed Rank test and 60% of the respondent's have given the correct answer.

Explanation: When we have to test the pre and post test scores then we use Wilcoxon Signed Rank test once we are not sure that the difference between pre and post test scores follows the normal distribution. The paired t-test is based on the arithmetic mean and standard deviation whereas this test is based on the median difference between two pairs. For instance, if we want to perform an intervention e.g. lecture, workshop, small group and would like to know its effectiveness then a knowledge questionnaire is constructed and administered before and after such intervention. Once we get scores from before (pre) and after (post) tests then we calculate the difference between them and test for normality. If the difference is not at all normally distribute then we can use the Wilcoxon Signed Rank test. For more details please visit this sites:
http://udel.edu/~mcdonald/statsignedrank.html
http://www.graphpad.com/articles/interpret/Analyzing_two_groups/wilcoxon_matched_pairs.htm
When you have small paired data use this site to calculate Wilcoxon Signed Rank test: http://www.fon.hum.uva.nl/Service/Statistics/Signed_Rank_Test.html

Shital Bhandary, October 10, 2009: 12:30 PM