THE SECOND SEMESTER OF THE 2020/2021 ACADEMIC YEAR

MODULE OF DATA ANALYSIS

Online Observations, Interviews, and Surveys

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This module is intended for students of Data Analysis in the second semester of the 2020/2021 academic year.

Universitas Kristen Duta Wacana

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Yogyakarta, 29 Januari 2021

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KATA PENGANTAR

Module kelas *Data Analysis* ini disusun sebagai salah satu referensi belajar mahasiswa dalam melakukan/praktik pengambilan data untuk persiapan skripsi di kemudian hari. Dalam modul ini terdapat penjelasan tentang tiga metode penelitian yang akan diajarkan di kelas *Data Analysis*, yaitu observasi, wawancara, dan survey daring. Tiga metode ini dipilih karena dianggap merupakan metode yang paling sering digunakan dalam penelitian di bidang pendidikan dan sosial humaniora. Materi disusun sedemikian rupa disesuaikan dengan urutan dalam silabus kelas, diawali dengan observasi daring, kemudian wawancara daring, dan ditutup dengan survey daring. Metode daring dipilih karena pembelajaran dilakukan di masa pandemi Covid-19 yang kurang memungkinkan pengambilan data secara luring.

Kelas ini menekankan praktik langsung dalam pengambilan data. Teori-teori penelitian juga dibahas, namun praktik mendapatkan porsi besar. Karena itu, asesmen kelas lebih menekankan kepada mahasiswa langsung "terjun ke lapangan" dan mengambil data dalam skema "*mini-research*" dan bukan pada tes-tes tertulis. Untuk memfasilitasi mahasiswa mampu memenuhi ekspektasi kelas ini, dalam modul selain silabus kelas juga disertakan dokumen-dokumen kelas lain seperti rubrik penilaian dan contoh dokumen yang membuktikan bahwa mahasiswa telah melakukan pengambilan data, misalnya: catatan lapangan dan *checklist* observasi.

Yogyakarta, 29 Januari 2021

Penyusun,

Adaninggar Septi Subekti, M.Sc.

DAFTAR ISI

Adapting your qualitative methods course for online learning

June 4, 2020

By Lai Yee Ho, co-founder of Delve

There's a lot of uncertainty about how higher education will be taught in the age of COVID-19. How should professors and instructors of qualitative methods courses re-think their curriculums for online classrooms or cohorts? How can students conduct observations if they're sheltered at home? How will students work in teams to analyze data if they're distributed across the world? Here are some tips for alternative data collection methods, and collaborative tools for remote analysis.

How to collect data without leaving the home

Observational data collection

Even when students can't leave their homes, there are still creative ways to develop the observation skills they need. They can switch to collecting data online in a variety of ways. Make sure your students are still gathering the necessary approvals and permissions to collect online data and making sure the privacy and security of the data they collect is sound.

Observe video calls

Students can listen in on video calls if the environment that they would have observed is now online. For example, a business meeting that used to be in person is now conducted over Zoom, have your students reach out to the meeting owner and see if they can call in as a passive bystander to conduct their observation. If the session is recorded, consider requesting access to view the recording.

Observe online communities

There are plenty of online communities that are active and filled with social interactions worth observing. With the right permissions and consent in place, your students can observe Slack Communities, Reddit Threads and Facebook Groups. Within the posts and comments, there are a plethora of conversations to learn from. This is a chance for your students to observe a community in their online space.

Collect in-context data through a diary study

Students can run online diary studies to gather data from participants in context of the activity they're observing. Diary studies are a great way to see snapshots of participants' lives that may be difficult to see when observing in-person. Students can do this by sending participants text messages throughout the day, or by using diary study tools like DScout or Obvi to gather recordings that participants take of themselves.

In-depth interviews

Conduct interviews over the phone or over video call

One of the simplest tried-and-true methods for doing in-depth interviews is conducting them over the phone or video call. Your students can use tools like Google Voice or Zoom to record the calls so they can get the recordings.

Manage and organize calls with online tools

There's a variety of online tools that make scheduling in-depth interviews seamless. Students can use tools like Calendly for scheduling, and then digital gift card options like Amazon to send incentives digitally.

How to analyze data with a distributed team

Use online transcription tools to turn recordings into transcripts

Students can use online tools like oTranscribe to turn the recordings into text transcripts. oTranscribe has easy keyboard shortcuts that would allow your students to start and stop the recording, capture timestamps, or slow down the recording for easy transcribing.

Know that these online method skills will still be valuable post-pandemic

Even though using online methods may feel like a compromise for learning qualitative methods, these are skills that will be valuable for your students for whatever research they do after taking your course. Even before the pandemic, online research methods have been a valuable way to learn about our increasingly connected world. Best of luck in adapting your course!

Taken from: https://ocean.sagepub.com/blog/tools-and-tech/adapting-your-qualitative-methods-course-for-online-learning

How to write an observation report: The introduction

The observation report requires you to do exactly as the title states– observe – but in a constructive and educational way. Basically, you are given the chance to express your views on how you see the world, the processes around you, the things around you and so on. Yes, there are some observation reports that might seem boring, let's say if you have to observe a plant (you can always choose a carnivorous one and have fun with it), but it's up to you to make it interesting. Remember: you are given the opportunity to observe something, you are responsible if you choose something boring or fun.

Tips on how to write an observation report

The task

First of all, you need to understand the task. What is it you need to observe? An object in your room? A chemical process? The evolution of a seed? Upon understanding the task, you can move forward and try to figure out what is it you find interesting to study, because as mentioned above, it's important to like what you do so that it will involve you completely.

The observation timeframe

One other thing to pay attention to when it comes to observation reports is the timeframe of the observation. There are certain projects that require a certain time frame (a day), there are others that expand to several months. The idea here is to understand how much it takes to finish this project and create a schedule around it. If you have to observe a plant growing in a timeframe of 6 months, you need to create the habit of checking up on it as often as possible.

The observation notes

Always take notes. Any changes that you might see during the time frame screening, note it down and write your impressions and observations. You might be surprised how easy it is for one to forget or let these little information slip off unknowingly. In this way, you will be completing your report gradually with information gathered from each step of the process, rather than just making some final observations at the end.

The pictures

If you really want to learn how to write an observation report, you should really want to know about how to make it presentable. Pictures are one great way to enhance your notes and illustrate the changes that have appeared during the timeframe observational process. With all this technology around, it's really simple to increase the chances of scoring big with your teachers because you can take pictures in a number of ways: zoomed in and out, macro, time-lapse videos, etc. If you are a tech enthusiastic geek, you can always use something smart and efficient (a GOPRO camera, maybe) to create a real feeling of how the transformation occurs. Additionally, if you want to score big and make a real impression, try to use fixed photos with

no shakes. You need to seem like a professional observer and that's why your work needs to be exquisite.

The observational kit

In order to master this task, you will need to build yourself an observational kit so that you will always have your tools close by when things need to be documented. However, the kit you assemble would depend entirely on the nature of the subject being observed. For traditional observations, you will need a notepad, a pencil and camera, but of course, it really depends on what you are documenting.

Conclusion

To conclude, these are some basic guidelines that you need to follow in order to learn how to write an observation report. If you follow these instructions and pick an observational object that sparks your interest, you will surely have a positive feedback from your audience and even the teacher.

Taken from: https://studybay.com/blog/how-to-write-an-observation-report/

Example of observation document

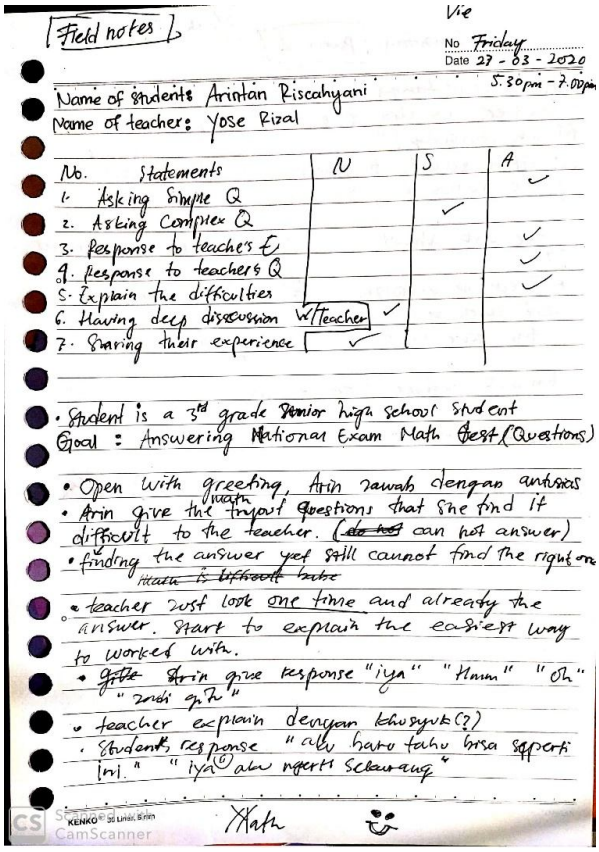
Observation Checklist

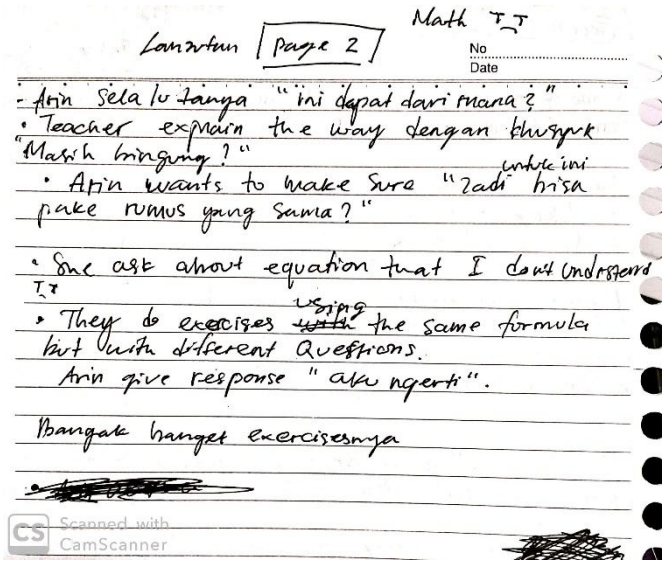
Observer's name : XXX
Student's name : YYY
Grade : 3rd grade (junior high school)
Date : Friday, 27th of March 2020
Time : 5.30pm – 7.00pm
Area of room observed : House (private lesson)

This checklist is used to measure to what extent student actively talk with the teacher in private lesson

No.	Statement	Never	Sometimes	Always
1.	Asking simple questions			√
2.	Asking complex questions		√	
3.	Response to teacher's explanation			√
4.	Answering teacher's questions			√
5.	Explain the difficulties they faced			√
6.	Having deep discussion with the teacher	√		
7.	Sharing their experience	√		

Field Notes





Example of observation document

Observation Report

RQ: To what extent student actively talk with the teacher in private lesson?

The private lesson that the student have is a weekly private lesson that have a meeting in a week. The teacher is an expert in this field since he teaches in many private lessons. The lessons taught in this private lesson is the lesson that will come out in the National Exam; Math, Bahasa Indonesia, English, Science, and Social. Each week the lesson taught is different, they follow the sequence made by the teacher and the teacher also prepare attendance list. The result of the observation was described further in the following paragraphs.

Private lesson

The observation was done in Friday, 27th of March 2020 in the student's house. This private lesson just has one student of third grade of junior high school and one teacher. For today's lesson, the lesson that been taught was Math and the goal of this lesson was the student is able to practice and answer the math test of National Exam.

In the beginning of the class, the teacher greeted the student and asking if she was ready or not and the student response it enthusiastically. The teacher asked the students about the difficulties that the student faced while doing the math tryout test. The student explained some questions that she did not understand to the teacher and she also explain that she already worked on the questions but she had not found the right answers. The teacher looked at the questions and start to explain the easy way to formulate the answer. The student paid attention on the teacher and always asking question like *"darimana angka ini di dapat?"* (where can I find this number) or *"jadi untuk ini bisa pake rumus yang sama?"* (so, I can use the same formula for this?). The student asked in curiosity or just want to make sure. After they finished the questions, the teacher gave new math exercises and told the student to make it using the same formula. Besides that, the student also asked question about equation and the complex formula of math that can she used in answering the questions. While doing the exercises, the student told the teacher about the difficulties she faced and the teacher helped her to formulate it. Every time the teacher explained, the student always gave some responses like *"Oh, iya"* (Oh, yes), *"hmm","oh jadi gitu."* (Oh, it is like that), *"aku baru tahu bisa seperti ini,"* (I just know it can be like this), *"iya, iya, aku ngerti sekarang."* (Yes, I can understand now). She gave good response to show that she understands the explanation. From the beginning until the end of the lesson, the teacher and the student actively gave questions and answers of all the test they worked with.

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TWELVE TIPS

Twelve tips for conducting qualitative research interviews

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ABSTRACT

The qualitative research interview is an important data collection tool for a variety of methods used within the broad spectrum of medical education research. However, many medical teachers and life science researchers undergo a steep learning curve when they first encounter qualitative interviews, both in terms of new theory but also regarding new methods of inquiry and data collection. This article introduces the concept of qualitative research interviews for novice researchers within medical education, providing 12 tips for conducting qualitative research interviews.

Introduction

In medical education research, the qualitative research interview is a viable and highly utilized data-collection tool (DiCicco-Bloom and Crabtree 2006; Jamshed 2014). There are a range of interview formats, conducted with both individuals and groups, where semi-structured interviews are becoming increasingly prevalent in medical education research. Qualitative interviews afford researchers opportunities to explore, in an in-depth manner, matters that are unique to the experiences of the interviewees, allowing insights into how different phenomena of interest are experienced and perceived. Considering the relationship between participants and researchers and the emphasis on the exploration of human phenomena, interviews have traditionally been a data-collection method linked with qualitative research and the naturalistic paradigm (Côté and Turgeon 2005; Halcomb and Davidson 2006).

In medical education, many researchers have a background in health care professional backgrounds, and although subjects, such as interview techniques and history-taking are included in medical, nursing, and other health professional curricula, the acquisition of interview skills for the purpose of collecting research data is not generally addressed in the broad spectrum of health care professional education. Consequently, making the transition from working as a health care professional to conducting medical education research involving qualitative research interviews presents a number of challenges (Hodges and Kuper 2012; Varpio et al. 2015). Not only does the new discipline present challenges in the form of engaging with new types of theoretical knowledge, often presented as learning theories, but novices to medical education research will undoubtedly encounter a range of new methods of inquiry and data collection, including the qualitative research interview (Laksov et al. 2017). Furthermore, there are few guidelines relating to the practice of conducting qualitative research interviews. Brinkmann and Kvale (2005) argue that one of the challenges of conducting interviews is that they are carried out under the naïve assumption that the researcher wants to achieve understanding through dialog and discussion. Interviews should not be conceived as informal chats with interviewees; instead they are data-collection instruments which can be used to penetrate a number of research questions. Consequently, given the emerging position of interviews in medical education research, we identify the need to articulate 12 tips for conducting qualitative research interviews.

The tips presented below borrow insights from our own experiences as qualitative researchers as well as from the extensive literature on qualitative research methods. The tips may be more useful in different phases of the interview, some tips may be relevant during the planning phase, others while conducting interviews, while others still are most relevant after the interview.

Tip 1

Identify when qualitative research interviews are appropriate

Qualitative interviewing is a data-collection tool that is useful in a range of methodological approaches and may therefore be applied to address a number of research questions. However, qualitative research interviews are preferable when the researcher strives to understand the interviewee's subjective perspective of a phenomenon rather than generating generalizable understandings of large groups of people, for example, the qualitative interview may lend itself well to exploring a patient's experience of illness, or a clinician's conceptions of learning in the workplace. As such, a study applying qualitative interviews holds the potential to give voice to minorities and groups in society that may not be heard elsewhere (Reeves et al. 2015). Moreover, one should consider the ethical dimensions of taking up time from

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interviewees and therefore only include as many participants as needed in the research project and who may have insights or experiences of the phenomenon in question.

Tip 2

Prepare yourself as an interviewer

The importance of accurate preparation on behalf of the interviewer should not be underestimated and includes conceptual and practical preparations (Brinkmann and Kvale 2005; Brinkmann 2014). Successful interviews start with careful planning that considers the focus and scope of the research question. Some background reading of the literature concerning the subject area as well as how to conduct qualitative interviews and the specific scientific method you are applying will be necessary in the further development of your research question(s) and it will additionally facilitate the construction of an interview guide.

When preparing for qualitative interviewing it is important to be familiar with the data recording equipment being used. The venue of the interview should also be considered as it may affect the data collection. We recommend interviews be conducted at a time and place of the respondents' convenience, in a comfortable setting, free from any potential disruptions and noise. In most cases, you will need formal ethical approval. However, you will always need your interviewees' informed consent (Illing 2014).

Tip 3

Construct an interview guide and test your questions

Conducting a qualitative research interview means that you may be asking your interviewees to reflect on matters that are potentially important to them, in some cases even life-changing. The phenomenon of your interest might be important professionally, or you may be interviewing participants on how they experience illness or the loss of a loved one. Therefore, you should develop your interview guide in advance and conduct at least one test interview. By conducting test interviews the novice researcher gains skills prior to embarking on data collection. These test interviews may be undertaken with peers or volunteers. They furnish the researcher with an opportunity to explore language, the clarity of the questions, and aspects of active listening. The style of the interview is essential for creating a noninvasive and open dialog with interviewees (Krag Jacobsen 1993). Avoid using esoteric jargon in your research interview questions and instead adopt layman's language when possible.

Qualitative interviews may be more or less open or structured. An unstructured or semi-structured interview guide may include only one or a few predetermined questions allowing the interviewer to explore issues brought forward by the interviewee. It is important that the interview guide aligns with the methodological approach (Laksov et al. 2017). By contrast, a structured interview guide usually includes predetermined questions posed in the same way to all interviewees with the purpose of eliciting responses to the exact same phrasing. In medical education, semi-structured interviews are often applied, meaning that the interview guide includes a number of predetermined questions (typically 5–15 questions) but the interviewer can probe, in order to dig deeper, into the interviewees' responses through follow-up questions (Lingard and Kennedy 2010). It is usually a good idea to open the interview with a few "easy" questions to make the interviewee comfortable and to familiarize him/her with the subject of the interview. A few examples are: "Please tell me, how long have you been working here?", "How did you first become involved in teaching?" or "Why did you want to become a nurse?" Further into the interview, questions like "In your opinion, what signifies a skilled teacher?" or "How have you experienced the work load in your current workplace?" are more likely to be answered considerately as opposed to if they were posed as the first question of the interview. A question like "Is there anything more you would like to add?" can be a suitable closing question.

Tip 4

Consider cultural and power dimensions of the interview situation

An assessment of the cultural dimensions as well as power dimensions is necessary prior to the interview (Nimmon and Stenfors-Hayes 2016). Such an analysis could entail a consideration of what the interview situation affords and what obstacles are likely to occur. People are cultural beings (Rogoff 2003) and may have different expectations of the interview situation. Some people may view the interview as a difficult or invasive situation, and some interviews may require a third person to sit in, either as an interpreter or as someone who is culturally sensitive to the interviewees' situation. The test interview outlined above may reveal such challenges. Medical teachers interviewing students need to be aware of both explicit and implicit power relationships and be conscious that students are not trying to comply with expectations of providing, what is perceived to be, a correct response. Similarly, a student interviewing teachers may involve and mirror a power relationship and would require careful consideration in advance.

Tip 5

Build rapport with your respondents

Building rapport and establishing comfortable interactions in the qualitative interview situation is very important and is preferably done well in advance of the interview, but also during the interview itself. A challenge when conducting interviews is that there may be little time in the interview situation to build trust (DiCicco-Bloom and Crabtree 2006). Therefore, you should draft a short summary of your research project, written in layman's terms, to send to your interviewees prior to the interview as a way of informing them of what to expect will be talked about in the interview and why it is an important topic to discuss.

Rapport is also crucial during the interview enabling the respondent to provide a rich and detailed account of the experiences at the heart of the study. Key to building rapport is a sense of proximity. If you already know your respondents, then it may be easier to build rapport; otherwise, this task may be more difficult. One way of building rapport is to approach interviewees with an open and curious attitude, stating specifically why you are interested in

their specific point of view (Krag Jacobsen 1993; Schoultz et al. 2001; Bell 2014). A question like “Please tell me about your interest in … ?” is likely to be understood as less threatening than “What rules and regulations do you follow when … ”

Tip 6

Remember you are a co-creator of the data

In qualitative research, the researcher is the prime instrument of data collection. Consequently, the interviewer needs to be reflexive, conscious, and aware about how his or her role might impact the conversation between the interviewer and interviewee. In the qualitative research interview, we argue that the interviewer should not be viewed as someone contaminating or biasing the data, but rather as a co-creator of data together with the interviewee, where the interviewer’s previous knowledge may play an important part in understanding of the context or the experiences of the interviewee. As such, the interviewer is not a passive player in the interview, but an instrument using his and her abilities, experiences and competencies in the interview situation (Lingard and Kennedy 2010). For example, an interviewer who is also a clinician may use his or her knowledge about the clinical environment and invite the interviewee to discuss clinical issues more in-depth than if the interviewer was unfamiliar to the clinical context. Therefore, we urge interviewers to make use of their background, albeit, in a considerate way.

Tip 7

Talk less and listen more

Inexperience as novice interviewers may result in the interviewer being overly active in the conversations. Due to nervousness in such situations, or a lack of experience, the interviewee may end up filling in blanks and driving the conversation in a certain direction without being aware of doing so. Interviewers may need to talk less and allow for silence to act as the catalyst that will drive the conversation forward. Actively listening to the interviewees means respecting silence and identifying such silent moments as an opportunity for ongoing reflection. Interviews on subjects that have profound meaning for interview subjects may prompt deep reflection on behalf of respondents. Thus, remain open and honest, maintain interest (Bowden and Walsh 2000; Seidman 2013), listen more, but also listen actively (Giger 2017).

Tip 8

Allow yourself to adjust the interview guide

Adjusting the questions after the initial interviews allows the interview guide to be fine-tuned during the interview process. Some questions might turn out to be misunderstood, others to be irrelevant or outside the scope of the research question. In one of our own studies, for example, the question “How do you experience the atmosphere here?” was understood by students as a question about the physical environment and the quality of the air, while the intention of the interviewer was to gain insight into the social environment in the clinic (Liljedahl et al. 2015). So be attentive, listen to how your interviewees respond, and reflect on whether your questions are being understood in the way you intended. During an interview, follow-up questions can help probe how your questions are understood. Also, be courageous and make changes in the interview guide before the next interview when necessary.

Tip 9

Be prepared to handle unanticipated emotions

In the field of medical education, we sometimes engage with research topics involving illness and death or interviewees’ own experiences of e.g. harassment, stress, failure, or interviewee’s experiences of students with mental illness. These and many other topics may evoke uneasy emotions in the interviewee, which he or she previously might have been unaware of. Therefore, the interviewer must be sensitive to the interviewee’s reactions when sharing experiences on certain topics. Sometimes interviewees will be capable of handling these emotions themselves, but at other times you, as an interviewer, will need to take action to protect your interviewee (Varpio and McCarthy 2018). This might involve interrupting the interview and guiding the interviewee to appropriate assistance. Invite the interviewee to bring up issues of the topic that are important to him or her, and always end the interview by asking the interviewee if there is anything they would like to add regarding the topic of interest in the interview.

Tip 10

Transcribe the interviews in good time

Once the data has been collected, the process of data transcription commences. Although rarely explicitly defined, transcription can be described as the process of reproducing spoken words, such as recorded data from an interview, and converting it into written form so the data can be analyzed. The most common form of transcription in qualitative interviews is verbatim transcription, which refers to the word-for-word reproduction of verbal data, where the written words are an exact replication of the audio-recorded words (Poland 1995). Transcribing data from qualitative interviews is very time-consuming. For novices, initial transcription may require as much as four to eight hours of transcription for each hour of recorded data. Furthermore, the process yields vast amounts of material which must be iteratively scrutinized and waded through when analyzing the data. It is easy to think that transcription is a somewhat straightforward conversion of the spoken word into written word. It is important to consider pauses, giggles, and other cues offered by the interviewee as markers for important events in the interview. These cues may need to be acknowledged in the transcription process. During the transcription process errors can creep in which can be the result of different factors. Consequently, steps need to be taken to check the quality of the transcription. Many investigators choose to transcribe the qualitative interviews themselves even though that is time-consuming and arduous, as it offers great

benefits in terms of getting to know the data. When doing so, we recommend researchers transcribe the interview as soon as possible after completion. Doing so allows the researcher to start identifying analytical structures and find similarities and differences between different interviewees' experiences.

Tip 11

Check the data

As part of ensuring trustworthiness in qualitative data-driven explorations, member checking, also known as respondent validation or participant validation, can be used. Member checking is a method of returning an interview transcript or debriefing the analytical results with participants for agreement (Lincoln and Guba 1985; Creswell 2013). Our experience suggests that this process offers novice researcher a good opportunity to check the quality of the data. As such, member checking may act as a sounding board and a way of checking that one has understood the reported responses of the respondents, especially when it comes to picking up subtleties such as irony, emotions, silences, or other gestures (Birt et al. 2016; McGrath et al. 2016). However, some researchers recommend caution with reference to member checking, as there may be some potential drawbacks such as conflicting views on interpretation (Angen 2000; Morse et al. 2002; Varpio et al. 2017).

Tip 12

Initiate analysis early

One of the main difficulties with qualitative research is that it very rapidly generates a large and cumbersome amount of data, often leading to hundreds of pages of transcribed text. Miles (1979) has depicted qualitative data as an "attractive nuisance"; it has attractiveness due to its richness, but effort is required to find analytical paths through that richness. Therefore, you will need to think about the analysis of data before conducting all the interviews. The nature of the research question(s) and how you go about the analysis will determine the depth, quality, and richness of the performed interviews. Hence, we advise that the analysis of the material is not left until all interview data has been transcribed. Procrastination of data analysis may give the investigator the impression of facing a monumental task; meanwhile, an advantage of starting the work soon is that early thoughts about the analysis allow the investigator to become more aware of emerging categories and themes.

Summary

The qualitative research interview is a powerful data-collection tool which affords researchers in medical education opportunities to explore unknown areas of education and practice within medicine. This paper articulates 12 tips for consideration when conducting qualitative research interviews, and outlines the qualitative research interview in general terms. We acknowledge that certain methodologies might demand alternative procedures than those described above. Although the 12 steps above are ordered sequentially, the qualitative interview, as a rigorous data collection tool, requires an iterative and reflective working process in order to best serve its purpose.

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The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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INTERVIEWING FOR RESEARCH

Canada Volunteerism Initiative
Initiative canadienne sur le bénévolat

By M. Easwaramoorthy & Fataneh Zarinpoush, Imagine Canada

What is an Interview?

An interview is a conversation for gathering information. A research interview involves an interviewer, who coordinates the process of the conversation and asks questions, and an interviewee, who responds to those questions. Interviews can be conducted face-to-face or over the telephone. The internet is also emerging as a tool for interviewing.

When is an Interview an Appropriate Research Method?

Interviews are an appropriate method when there is a need to collect in-depth information on people's opinions, thoughts, experiences, and feelings. Interviews are useful when the topic of inquiry relates to issues that require complex questioning and considerable probing. Face-to-face interviews are suitable when your target population can communicate through face-to-face conversations better than they can communicate through writing or phone conversations (e.g., children, elderly or disabled individuals).

Types of Interviews

Interviews can be designed differently depending on the needs being addressed and the information. They can be grouped into three types:

Structured interviews: In a structured interview, the interviewer asks a set of standard, predetermined questions about particular topics, in a specific order. The respondents need to select their answers from a list of options. The interviewer may provide clarification on some questions. Structured Interviews are typically used in surveys (see our "Survey Research Methods" Tip Sheet for more information).

Semi-structured interviews: In a semi-structured interview, the interviewer uses a set of predetermined questions and the respondents answer in their own words. Some interviewers use a topic guide that serves as a checklist to ensure that all respondents provide information on the same topics. The interviewer can probe areas based on the respondent's answers or ask supplementary questions for clarification. Semi-structured interviews are useful when there is a need to collect in-depth information in a systematic manner from a number of respondents or interviewees (e.g., teachers, community leaders).

Unstructured interviews: In an unstructured interview, the interviewer has no specific guidelines, restrictions, predetermined questions, or list of options. The interviewer asks a few broad questions to engage the respondent in an open, informal, and spontaneous discussion. The interviewer also probes with further questions and/or explores inconsistencies to gather more in-depth information on the topic. Unstructured interviews are particularly useful for getting the stories behind respondents' experiences or when there is little information about a topic.

Steps in Conducting an Interview:

Before the Interview:

1. Define your objectives ⟶ identify what you want to achieve and the information you need to gather. Make sure an interview is the appropriate way to meet your objectives.
2. Choose the type of interview ⟶ Review your required information, budget, time, and potential respondents and decide whether you need to conduct structured, semi-structured, or unstructured interviews.
3. Choose the appropriate respondents → Depending on the type of interview, decide on the characteristics of interviewees and the number of interviews required.
4. Decide how you will conduct the interviews → Consider telephone or face-to face interviews. For large surveys, consider computer-aided interviewing and recording.
5. Decide how to recruit your respondents → Obtain contact information for a number of respondents larger than the number of interviews you need, since some may not respond. Contact them by phone, e-mail, or regular mail and introduce yourself, your organization, and your project. Explain the purpose of the interview, the importance of their participation, and set up an appointment.

6. Decide how you will record the interviews → Depending on the type of interview, you may fill in a prepared form, use written notes, voice recorders, or computer-aided devices.
7. Make a list of questions and test them with a sample of respondents → the questions must be aligned with the type of interview. If you are running structured interviews, see our Tip Sheets on "Questionnaire Design" and Survey Research Methods" for more information.
8. Decide who will conduct the interviews → develop an information kit that includes an introduction to the research topic and instructions. For unstructured interviews, you may need to hire skilled interviewers.

During the interview:

1. Introduce yourself and initiate a friendly but professional conversation.
2. Explain the purpose of your project, the importance of their participation, and the expected duration of the interview.
3. Be prepared to reschedule the interview if a respondent has a problem with the timing.
4. Explain the format of the interview.
5. Tell respondents how the interview will be recorded and how the collected information will be used → if possible, obtain their written consent to participate.
6. Ask respondents if they have any questions.
7. Control your tone of voice and language → remain as neutral as possible when asking questions or probing on issues.
8. Keep the focus on the topic of inquiry and complete the interview within the agreed time limit.
9. Ensure proper recording → without distracting the respondent, check your notes and voice recorder regularly.
10. Complete the session → make sure all questions were asked, explain again how you will use the data, thank the respondent, and ask them if they have any questions.

After the interview

1. Make sure the interview was properly recorded → make additional notes, if needed.
2. Organize your interview responses → responses from unstructured and semi-structured interviews need to be transcribed. Responses from structured interviews need to be entered into a data analysis program.
3. Get ready for data analysis → search for resources for analyzing qualitative and/or quantitative data.

Checklist for Conducting Interviews:

- ☐ Have you identified research questions that will be adequately addressed by using interviews?
- ☐ Have you chosen the appropriate type of interview?
- ☐ Have you selected an interviewer?
- ☐ Have you prepared the list of questions?
- ☐ Have you tested them?
- ☐ Have you decided on the setting of interviews and how responses should be recorded?
- ☐ Have you contacted your respondents and set up appointments?
- ☐ Have you obtained enough data for analysis?

For More Information:

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Strategies for Qualitative Interviews

A Few General Points

- Stop and Think: should interviews be included in your research design?
    - Are there alternative ways of answering your research question through documentary review, observation or unobtrusive measures?
    - Be clear about the possible biases and limitations of interviews
- The point of a qualitative interview is to let the respondent tell their own story on their own terms.
- THIS IS NOT A SURVEY! The guide acts as a prompt, reminding you of necessary topics to cover, questions to ask and areas to probe. As such, it should be simple so that your primary focus can stay on the respondent. It's best to memorize your guide!
- How much time will you spend with each respondent? Adjust your guide accordingly (it may take several interviews to judge the correct length).
- Try out a new guide (or parts of it) on friends and get their feedback before using it in the field.

Should you record and transcribe interviews?

PROS:

- It helps to correct the natural limitations of our memories and of the intuitive glosses that we might place on what people say in interviews
- It allows more thorough examination of what people say
- It permits repeated examinations of the interviewees' answers
- It opens up the data to public scrutiny by other researchers, who can evaluate the analysis that is carried out by the original researchers of the data (that is, a secondary analysis)
- It therefore helps to counter accusations that an analysis might have been influenced by a researcher's values or biases
- It allows the data to be reused in other ways from those intended by the original researcher—for example, in the light of new theoretical ideas or analytic strategies.

CONS:

- It introduces a different dynamic into the social encounter of the interview, and recording equipment may be off-putting for interviewees.
- Transcribing is a very time-consuming process. It also requires good equipment, usually in the form of a good-quality tape recorder and microphone but also, if possible, a transcription machine. Transcription also very quickly results in a daunting pile of paper.

A Successful Interviewer is:

1. *Knowledgeable*: is thoroughly familiar with the focus of the interview; pilot interviews of the kind used in survey interviewing can be useful here.
2. *Structuring*: gives purpose for interview; rounds it off; asks whether interviewee has questions.
3. *Clear*: asks simple, easy, short questions; no jargon.
4. *Gentle*: lets people finish; gives them time to think; tolerates pauses.
5. *Sensitive*: listens attentively to what is said and how it is said; is empathetic in dealing with the interviewee.
6. *Open*: responds to what is important to interviewee and is flexible.
7. *Steering*: knows what he/she wants to find out.
8. *Critical*: is prepared to challenge what is said, for example, dealing with inconsistencies in interviewees' replies.
9. *Remembering*: relates what is said to what has previously been said.
10. *Interpreting*: clarifies and extends meanings of interviewees' statements, but without imposing meaning on them.
11. *Balanced*: does not talk too much, which may make the interviewee passive, and does not talk too little, which may result in the interviewee feeling he or she is not talking along the right lines.
12. *Ethically sensitive*: is sensitive to the ethical dimension of interviewing, ensuring the interviewee appreciates what the research is about, its purposes, and that his or her answers will be treated confidentially.

The Interview as an Interpersonal Encounter

- The social skills of empathy, warmth, attentiveness, humor (where appropriate), and consideration are essential for good interviewing.
- Any judgmental attitudes, shock or discomfort will be immediately detected.
- Never answer a question for the respondent.
- One must be completely engaged with the respondent, while at the same time keeping track of the questions one needs to ask.
- Use every active listening technique at your disposal:
    - Repeating back
    - "Wow!
    - Tell me more about that!"
    - "That is really interesting."
- Don't be afraid of silence; you can use it to prod the respondent to reflect and amplify an answer
- Don't follow the interview guide—follow the respondent. Follow up new information that he or she brings up without losing sense of where you are in the interview.
- Try not to think about time—relax into the interview.

Guidelines for Developing Interview Questions

- Questions should be simple. Do not ask more than one question at a time.

- The best questions are those which elicit the longest answers from the respondent. Do not ask questions that can be answered with one word.

- Don't ask questions that require your respondents to do your analysis for you. This is YOUR job.

- Likewise, do not ask for hearsay or opinions on behalf of the group they are a part of "What do people around here think of x?" You rarely get anything interesting.

- Don't be afraid to ask embarrassing questions. If you don't ask, they won't tell.

- Types of questions or other interview talk:
    - *Direct questions*: 'Do you find it easy to keep smiling when serving customers?'; 'Are you happy with the way you and your husband decide how money should be spent?' Such questions are perhaps best left until towards the end of the interview, in order not to influence the direction of the interview too much.
    - *Indirect questions*: 'What do most people round here think of the ways that management treats its staff?', perhaps followed up by 'Is that the way you feel too?', in order to get at the individual's own view.
    - *Structuring questions*: 'I would now like to move on to a different topic'.
    - *Follow-up questions*: getting the interviewee to elaborate his/her answer, such as 'Could you say some more about that?'; 'What do you mean by that . . .?'
    - *Probing questions*: following up what has been said through direct questioning.
    - *Specifying questions*: 'What did you do then?'; 'How did *X* react to what you said?'
    - *Interpreting questions*: 'Do you mean that your leadership role has had to change from one of encouraging others to a more directive one?'; 'Is it fair to say that what you are suggesting is that you don't mind being friendly towards customers most of the time, but when they are unpleasant or demanding you find it more difficult?'

Step-By-Step Guide to Writing Interview Questions

1. Write down the larger research questions of the study. Outline the broad areas of knowledge that are relevant to answering these questions.

2. Develop questions within each of these major areas, shaping them to fit particular kinds of respondents. The goal here is to tap into **their** experiences and expertise.

3. Adjust the language of the interview according to the respondent (child, professional, etc.).

4. Take care to word questions so that respondents are motivated to answer as **completely** and **honestly** as possible.

5. Ask "how" questions rather than "why" questions to get stories of process rather than acceptable "accounts" of behavior. "How did you come to join this group . . .?"

6. Develop <u>probes</u> that will elicit more detailed and elaborate responses to key questions. The more detail, the better!

7. Begin the interview with a "warm-up" question—something that the respondent can answer easily and at some length (though not too long). It doesn't have to pertain directly to what you are trying to find out (although it might), but this initial rapport-building will put you more at ease with one another and thus will make the rest of the interview flow more smoothly.

8. Think about the logical flow of the interview. What topics should come first? What follows more or less "naturally"? This may take some adjustment after several interviews.

9. Difficult or potentially embarrassing questions should be asked toward the end of the interview, when rapport has been established.

10. The last question should provide some closure for the interview, and leave the respondent feeling empowered, listened to, or otherwise glad that they talked to you.

Using Descriptive Statistics

From the boxplots it is hard to read the exact values of the median, quartiles, interquartile range and range. SPSS can calculate these easily.

Earlier we used the Explore command to calculate statistics for each group, young and mature. It is worth noting that if you have paired data you can put more than one variable into the dependant list and don't need to put any factors in, if you do this it works rather like the "Frequencies" method we looked at to begin with.

If you want to do it again to recap; from the ***Analyze*** *menu select* ***Descriptive Statistics*** *then* ***Explore.*** *The dependant list refers to the quantity we are measuring, in this case, the number of times people speak. In the factor list we put the factor that we are investigating, in this case "age".*

SPSS will calculate the stats for each group.

Mean (Young) _ _ _ _ _ _ _ _ _

Mean (Mature) _ _ _ _ _ _ _ _ _

From the output find the **Mean** and **Median** of each group. The mean and median are both forms of average, do they seem to agree?

Median (Young) _ _ _ _ _ _ _ _ _

Median (Mature) _ _ _ _ _ _ _ _ _

You can read (in the Glossary) that the **median** is a measure of central tendency. It gives us a kind of centre for each group, and allows us to say that students in one group 'on average' make more verbal contributions than students in another. The **interquartile range** is a measure of spread, on a boxplot it is the distance between the top and bottom of the box, and tells us something about how varied students in each group are. Look at the **mean** and the **standard deviation** (Std. Deviation also abbreviated to S.D. and sometimes s or σ) in your descriptive statistics. What do they tell you about the data? When you have had a good look, read about both in the Glossary.

The **standard deviation** is not the same as the **interquartile range**, but both are measures of spread or variation. When comparing datasets, the set with greater standard deviation will usually have the greater interquartile range.

You should get; Mean (Young)=12.77; Mean (Mature)= 40.00; Median (Young) =11.00; Median (Mature)=31.50

Another way of storing the data - a note to remember when putting in your own data.

The file we are looking at stores the data for each group using a discriminatory variable to tell us which group the case is from, this is preferred by SPSS, there is an alternative structure for this. To see this structure look at the file Students.sav The data it holds is just the same but is not as well suited to analysis by SPSS. It is important you pick the correct structure for your own data if you want to produce meaningful analyses.

More on Different types of data

To finish Task 2, read about nominal, ordinal, interval and ratio data in the Glossary. What kind are the data you have been studying in Task 2?

It is important that you understand the difference between data types, the type of data affects how it can be reasonably analysed.

For example the type of average we would use depends on the type of data, refer to the glossary to fill in the table below...

Example	Type of data	Mean, median or mode
We have the body weight of eight people and want to find an average, one person has a recorded weight considerably larger than any other, it could even be a typing error.		
We have 250 heights of female clients and want to give an idea of the average height.		
A researcher collects the type of housing that a sample of clients live in, single room, flat, terrace etc., what type of average can we use to talk about the typical type of housing for the sample of clients?		
Students are asked to score the taste of a new recipe of bun as like/dislike/don't know, what type of data have we collected and what average might you use?		

Answers; Body weight of 8 people including a possible outlier, these data are ratio but due to the small sample size and the possible error causing an outlier the median might be safer than the mean, usually the mean would be best for these ratio measurements. The 250 female heights are ratio data and the mean would be fine for these data. The housing type is at least categorical, however we might choose to rank the categories in order of size, e.g. flat, terrace, semi... and so on, this could pass for ordinal data with some caveats, if so the median might be employed, otherwise the mode is safest. Like/dislike/don't know, gives us three categories, even writing the categories as like/don't know/dislike, doesn't convince me that they represent ordinal data, it might be better to discount those who "don't know" and treat the remaining dichotomous variable. You could then analyse with percentages, e.g. "of those expressing a preference 73% preferred the new recipe." the percentage expressing how many expressed a preference could also be quoted.

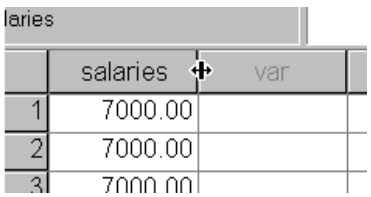
The difference between Mean and Median

Open a new data file, we are going to type in a few figures. (from the menus choose **File, New, Data** – you will be prompted to save alterations to the last data you were editing.)

Put the following numbers in the first column;

7000, 7000, 7000, 7000, 7000, 7000, 7000, 7000, 7000, 100000.

Give the column the title 'Salaries' (you need to click onto the Variable View for this – notice that SPSS ignores the capital letter in a variable name). Back in Data View you may want to alter the column width by dragging the vertical bar next to the variable name.



The numbers represent the annual salaries of the 10 permanent employees of a small (mythical) private clinic. Which is the director's?

Run Descriptive Statistics to find the mean and the median. If you were the union negotiator for the employees of the clinic which of the two average salaries would you quote to the press? If you were the owner of the clinic which might you quote?

Find the inter-quartile range and the standard deviation. Can you sketch what the Boxplot would look like? Create the Boxplot on SPSS if you like.

Summary: Mean vs. Median - both are types of average. The mean is based on all the data values, however because of this it is prone to being unduly affected by outliers in the data, most noticeably when the sample is small. The median however is largely unaffected by one or two extreme outliers, even in small samples, it is simply the middle value.

An example: The table below is from the UK adoption statistics for the year 2003. (http://www.dfes.gov.uk/rsgateway/DB/SBU/b000425/index.shtml) Although we don't have the original data with the individual ages of the children, this has presumably been used to create the average, unfortunately we are not made aware whether the average used was the mean or median.

Age at adoption	*2003*
Under 1	*240*
1 to 4	*2,100*
5 to 9	*1,000*
10 to 15	*180*
16 and over	*10*
Average age	*4 years 3 months*

Have a look at the available summary of the data in the table, which type of average would the relatively small number of older children have the greatest effect on? Think about the effect of two extra children on the mean or median, one child under 1 and one age 16, how would they affect each type of average? What type of average do you think would be best for this type of data?

Thoughts on this example: The problem with using the mean on the data for this application is that a relatively small number of older children will increase the mean disproportionately.

If we want to convey a general figure for the age of adoption it might be better to either say a more general statement like "well over half the children adopted in 2003 were between the ages of one and four" this succinctly paints a picture of the figures, alternatively we could use the median rather than the mean, this would combat the tendency for the small number of much older children to skew the average higher.

Task 3 Standard Deviation (S.D.) what is it?

What is the Standard Deviation (S.D.) really measuring? What can it tell us about our data?

Name	German	Geography	IT
Fred	27	42	39
John	22	26	34
Mary	54	32	31
Alan	49	34	29
Joan	67	32	32
Peter	16	31	11
Mavis	46	34	29
Sarah	20	31	31
Adam	21	41	67
Daniel	11	30	30

The table above shows the German, Geography and IT results of a group of ten students. Use SPSS to help you fill in the shaded area below on these notes, i.e. the mean, maximum and minimum for each subject. (The data is stored in a file called "***std dev example.sav***" *If you can't remember how to open files re-read the instructions on page 8.*)

MEAN			
MAX			
MIN			

HINT:
- From the **Analyze** menu select **Descriptive-Statistics** then **Frequencies.**
- Select all the variables (get them from the left into the right pane).
- Click the **Statistics** button and select the options for mean, maximum & minimum, then click **Continue**.
- Uncheck the option to display frequency tables. Click **OK**.

Looking at the figures for mean, maximum and minimum, what can you say about the three sets of figures?

Answer the questions below.

1 Which set(s) of figures has the largest range?

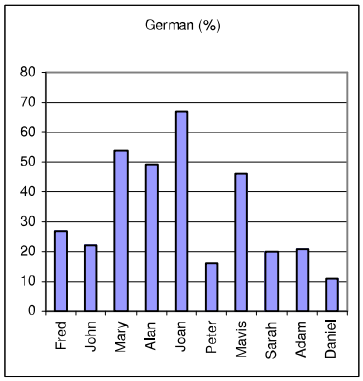
2 Which set(s) of figures has the largest number in it?

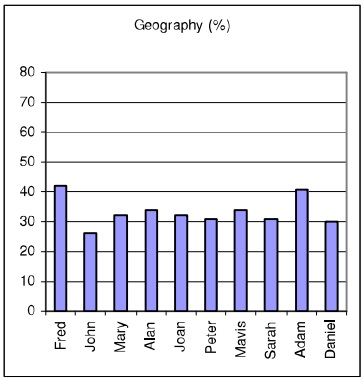
3 Which set(s) of figures contains the smallest number?

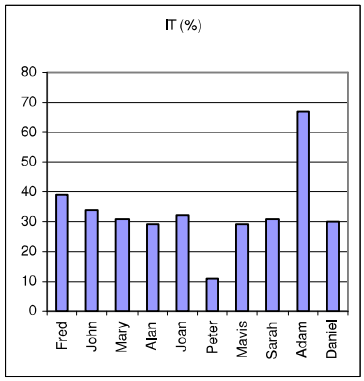
4 Which set of figures has the largest minimum?

Given the figures for mean, maximum and minimum it is hard to differentiate between the German and IT figures, the mean, (arithmetic mean) of the figures is the numbers all added together then divided by the number of numbers. However it gives no indication of the distribution of the marks within the sets of figures.

To do this we could graph the three sets of figures and see if that helps us (later we will create bar charts, for now just look at these).







Look at the three graphs above. Which two do you think are most similar?

I think the Geography and IT graphs but it's rather subjective. They do seem to have less variation in the values than the German results.

Question: *How can we asses this in a fair, unambiguous way, to find out which of the three has the least widely deviating set of numbers?*

Answer: Use the **Standard Deviation**.

The standard deviation of a set of numbers is a measure of how widely values are dispersed from the mean value. You can work the standard deviation (S.D.) out for a set of numbers manually if you are so inclined in a similar fashion to working a mean out; it just takes longer because the formula is much more complex! So let SPSS do it.

To work out the standard deviation of the numbers in each column use **Descriptive Statistics** then **Frequencies** from the **Analyze** menu.

Select the three variables (get German, Geography and Information Technology (IT) from the left into the right pane).

Using the Frequencies option rather than Descriptives gives us a larger range of statistics available.

Click the "**Statistics**" button and select the Standard deviation as well as mean, maximum and minimum, then click "**Continue**".

Before pressing OK on the Frequencies dialog box, uncheck the option to display frequency tables then click **OK**

Because the figures for each subject are in the same units we can compare the standard deviations and see how widely dispersed the values are.

	German	Geography	IT
S.D.			

The values I got for the data are below. Look at the graphs and the S.D. values to decide if high S.D. values indicate large or small deviations in the data. High S.D. values indicate a greater spread of values.

To show this, create a new variable by copying the number 33.3 down ten cells. The total should be 333, the mean, median, maximum and minimum should all be 33.3, what is the standard deviation? (Have a guess before you calculate it.)

Now you've worked out the values for the standard deviation answer the following questions. The values I got are; German, 19.044, Geography, 4.877, IT, 13.849

1. Which set of figures, German, Geography or IT, is the least spread out?

2. Of the two subjects with the same mean, and the same range, which varies least?

3. Which of the three sets of figures, German, Geography or IT varies most?

I think the answers are:

Geography is the least spread out.
Of the two subjects with the same mean, and the same range, IT varies least.
German varies the most.

A real data example to look at: **Comparison of Visual Estimations and Mean Goniometric Measurements of wrist flexion and wrist extension.**

Load the file **goniometry.sav** the file contains estimates and measurements of wrist movement. The angle measurements were taken using a goniometer. Use SPSS to calculate the Mean, Median, Standard Deviation and Range for the estimated and measured flexion. (i.e. Flexion Estimate & Flexion Measurement)

Look at the figures you have calculated and decide...

1	Which column of flexion results appears most varied?	estimated ☐ measured ☐
2	Was the tendency to underestimate or overestimate the flexion?	underestimate ☐ overestimate ☐
3	On a Boxplot of these data, Which set of flexion results would you expect to have the biggest box?	estimated ☐ measured ☐

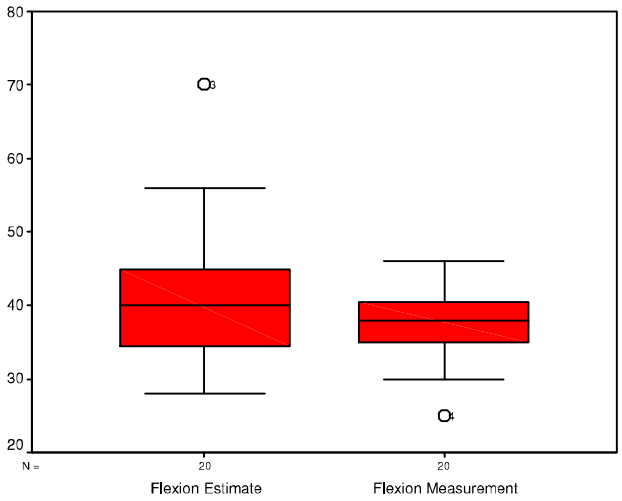
1. Which column of flexion results (estimated or measured) appears most varied? The adjacent results would lead me to say that the estimate is more variable. (SD is greater.)

Statistics

		Flexion Estimate	Flexion Measurement
N	Valid	20	20
	Missing	0	0
Mean		42.25	37.40
Median		40.00	38.00
Std. Deviation		10.172	4.999
Range		42	21

2. Was the tendency to underestimate or overestimate the flexion? The above results show a slight over estimation, but it is quite a small difference and may be due to chance.

The Boxplot for the two variables allows a visual comparison of the level and spread. To get this boxplot you need to remember that these data are "Summaries of separate variables" rather than "Sumaries for groups of cases". It looks like the estimate has the larger IQR to me! (The bigger box is the bigger Inter Quartile Range.)



Summary: Range, IQR & SD are all measures of spread. Only the SD takes all the data values into account, however this leaves it open to problems similar to the mean, i.e. a tendency to be swayed inordinately by extreme values. The range is extremely sensitive to outliers, since it is based only on the smallest and largest values. The Inter Quartile Range is again based on only two values, the upper and lower quartiles, these are on each end of the middle half of the data, therefore less effected by extremes.

A Simple example: A researcher is investigating the height of adult females living in two towns. She believes that the women from Youngville are, on average taller than those who live in Oldton., If the mean heights and Standard deviations were as follows;

Town	*mean*	*Standard deviation*	
Youngville	*175cm*	*5.25*	☐
Oldton	*169cm*	*15.50*	☐

Which sample varies most?

Thoughts on this example: The sample from Oldton seems more varied - it does perhaps lead us to think there are some differences in the samples other than the people in one town being taller.

Task 4 Histograms and the Normal Distribution

Using Histograms to look at the distribution of data.

We have already seen that two sets of figures may have the same mean but the data may be spread around the mean more widely in some populations than others.

Boxplots provide a simple graphical representation of how the values are distributed in the data. The Standard Deviation gives a numerical value to the level of spread.

A Histogram can give a picture of the data! It is a very powerful tool when used appropriately; it can let us see the distribution of the data. It does though need quite a large amount of data to give a nice bell shaped graph.

In this task we will use histograms to look at the shape of distributions, you might though want to apply this technique in other situations.

Heights of adult males. (*Source: Final Report of the Anthropometric Committee to the British Association (1883), p. 256.*)

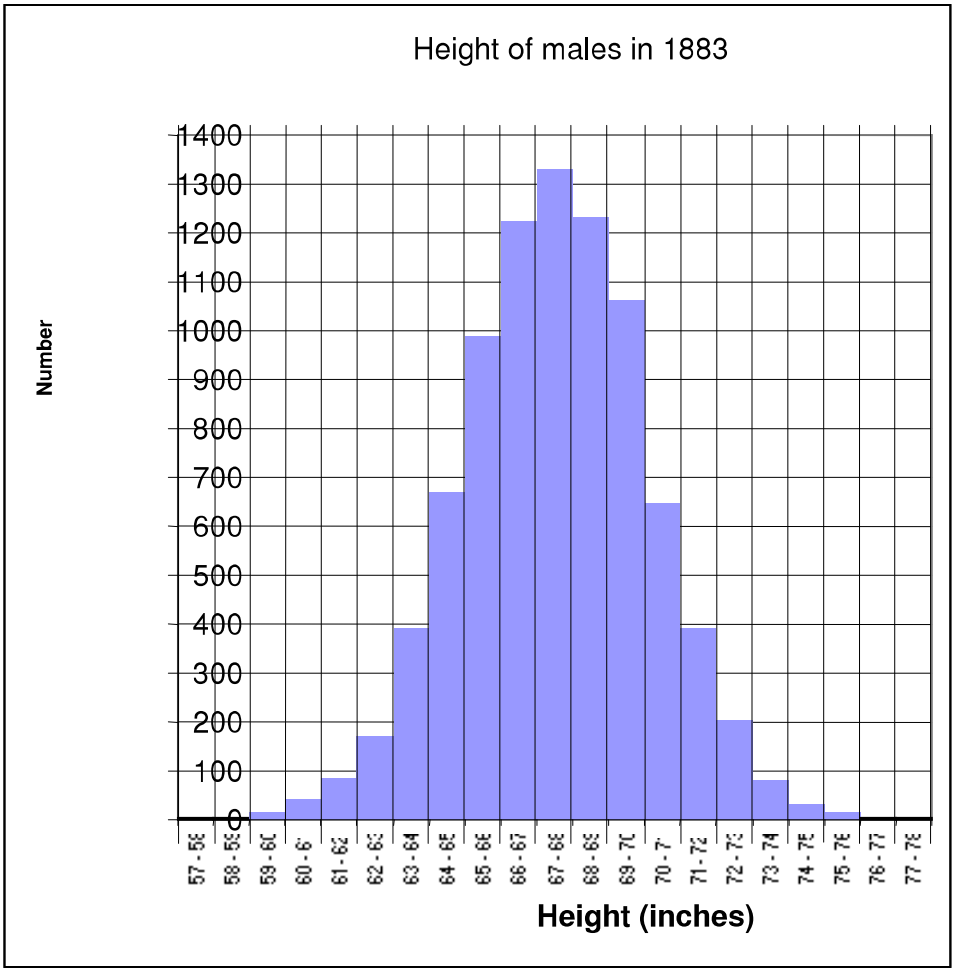
Height	Number
57 - 58	2
58 - 59	4
59 - 60	14
60 - 61	41
61 - 62	83
62 - 63	169
63 - 64	394
64 - 65	669
65 - 66	990
66 - 67	1223
67 - 68	1329
68 - 69	1230
69 - 70	1063
70 - 71	646
71 - 72	392
72 - 73	202
73 - 74	79
74 - 75	32
75 - 76	16
76 - 77	5
77 - 78	2

The data in the table gives heights of adult males in 1883. It represents the heights of 8585 adult males; the data is gathered in inches - this doesn't cause us any great problem since for this exercise we are concentrating on the shape of the distribution of heights. (If you really need to know, 1 inch = 2.54cm approximately)

The table is drawn from the heights of 8585 males. Rather than have a table with all 8585 heights it is summarised by giving the number of individuals in each height range, e.g. there were two people in the lowest range, covering people from 57 inches up to 58 inches. It isn't too clear from the table but we can assume that anyone who was exactly 58 inches tall would be in the 58-59 category.

Below the table is reprinted horizontally; on the next page is a histogram of the data it give a pretty good example of the bell-shaped Normal distribution.

Number	2	4	14	41	83	169	394	669	990	1223	1329	1230	1063	646	392	202	79	32	16	5	2
Height	57 - 58	58 - 59	59 - 60	60 - 61	61 - 62	62 - 63	63 - 64	64 - 65	65 - 66	66 - 67	67 - 68	68 - 69	69 - 70	70 - 71	71 - 72	72 - 73	73 - 74	74 - 75	75 - 76	76 - 77	77 - 78



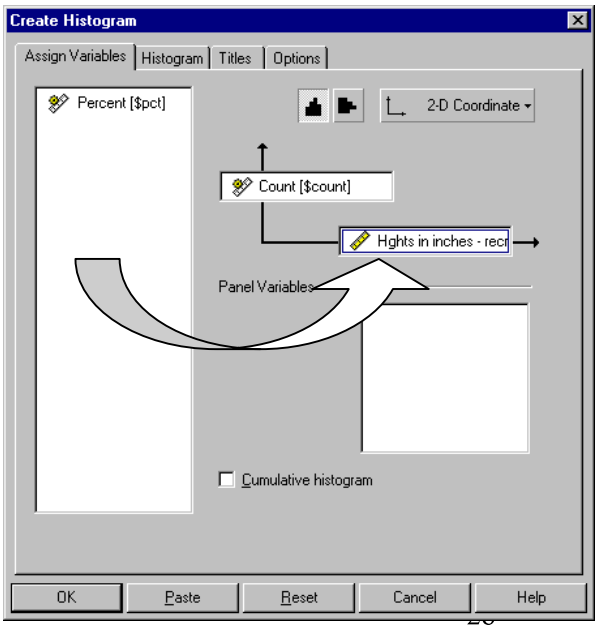
This manual version shows the typical bell shaped normal distribution. This distribution is sometimes referred to as a Gaussian distribution, for our purposes the two are similar enough.

Drawing the same graph in SPSS.

Load the file called **Reconstructed male heights 1883.sav** This file contains data that is similar to that from which the table you have seen was derived. The file contains 8585 heights, measured in inches.

We are going to create a histogram from the values in the variable called **hgtrein**

From the menus choose **Graph, (Legacy,) Interactive, Histogram**.

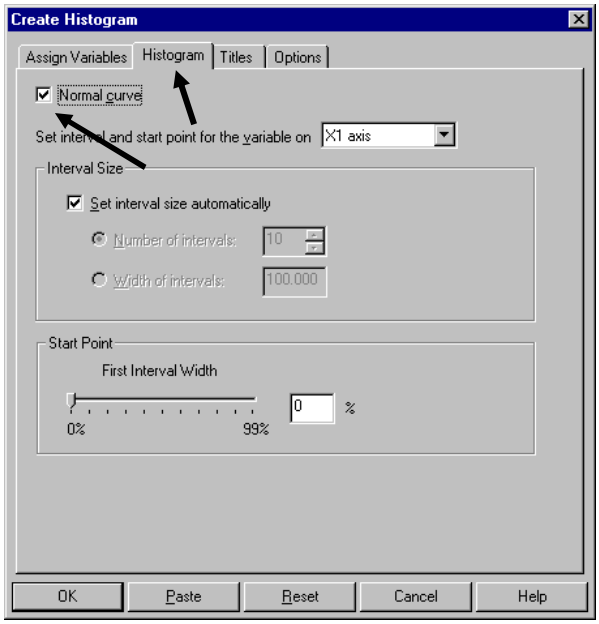


It is wise to press the **Reset** button in the Create Histogram dialog, to prevent the scales from previous data being used.

Drag the **hgtrein** (Heights in inches - reconstructed) variable over to the box representing the horizontal axis of the graph.

Click **OK** and wait to see the graph in the output viewer.

You should see a normal (bell shaped) pattern to the distribution of the data. This is typical in many natural distributions. The majority of subjects are clustered round the mean and the numbers of individuals in the categories more distant from the mean is far less, in this example there are less very tall or very short males.

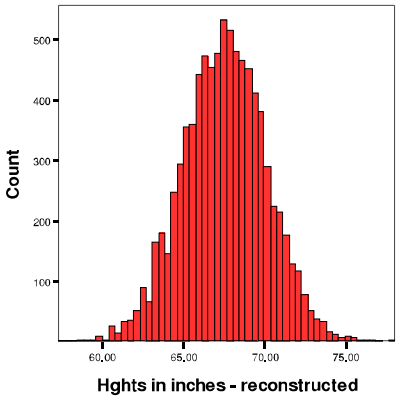


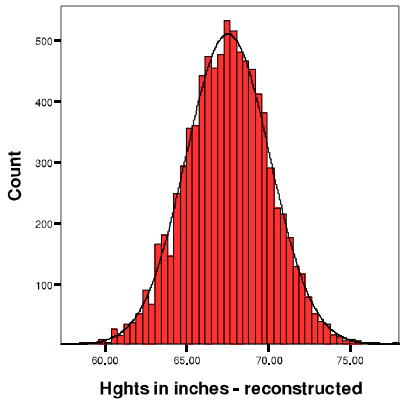
To see a normal curve superimposed on the graph go back to the Create Histogram dialog box (from the menus **Graph, (Legacy,) Interactive, Histogram**) then click on the **Histogram** tab and tick the "Normal curve" check box, then Click **OK.**

Are these data Discrete or Continuous? Read about Continuous and Discrete data in the glossary to help answer this.

The graphs below show the output you should see if you follow the instructions. The first two are the histograms without and then with the normal curve superimposed.

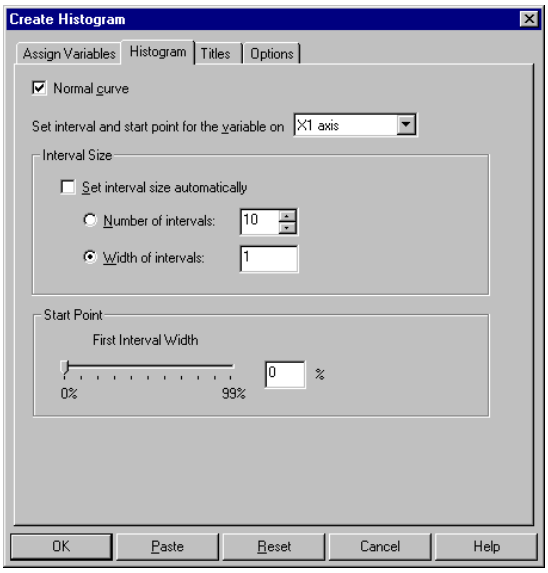
By the way the data are continuous do check in the glossary if you don't know why.





A tweak for the more confident to try…

On the Histogram tab of the Create Histogram dialog, switch off the automatic size interval setting and change the interval width from 100.000 to 1.



Compare 19th to 20th century heights.

The file **malehgts1990s.sav** contains heights for males of a more contemporary nature. There is less data so the bell shape may not be as smooth.

Follow the instructions again for creating a histogram using this data, work in mm or inches. If you choose inches then you can compare the histograms easily to the ones done earlier.
Are people getting bigger?

The normal distribution important, not just because it gives a pretty curve but also because many inferential tests assume normality in the data distribution.

Which of the following examples would you expect to be normally distributed?

Normally distributed?	Yes	No
Ages of people in a town.		
Heights of 20 year old men.		
Weights of one-year-old squirrels.		
The price of drinks in a bar.		
The life (in hours switched on) of light bulbs.		

Normally distributed?	Yes	No
Ages of people in a town.		✓
Heights of 20 year old men.	✓	
Weights of one-year-old squirrels.	✓	
The price of drinks in a bar.		✓
The life (in total hours switched on) of light bulbs.	✓	

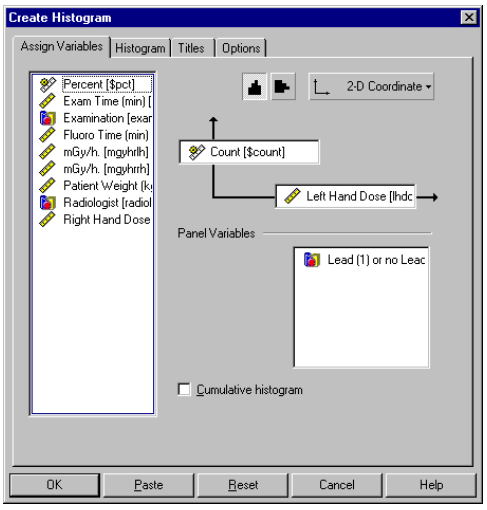
Another example of data with a discriminatory variable in:

This example reinforces the idea of a discriminatory variable. The file **Radiologist dose with and without lead combined.sav** contains data gathered to asses the effect of a lead screen to reduce the radiation dose to Radiologists hands while carrying out procedures on patients being irradiated.

In the trials the lead screen was placed between the patient and the radiologist, the intended effect was to reduce the radiation dose to the radiologist, however there were fears that working through the screen would lengthen the procedure. We want to answer two questions with this data, one about the hand dose and the other about the length of time the examination took.

Look at the data, the variable called "screen" is the variable that lets you discriminate between procedures carried out with or without the lead screen. If there is a 1 in the screen variable column it means the procedure was carried out with the screen in place, if not the value is 0.

We can use this discriminatory variable to create two histograms at once, by using it as a panel variable.



The variable we are interested in is the dose to the radiologists' left hand, the left-hand would be nearest the patient so we will concentrate on the left-hand dose variable.

Draw an interactive histogram using the left-hand dose variable (**lhdose**) and the discriminatory variable (**screen**) as the panel variable.

What do the histograms show us about the data?

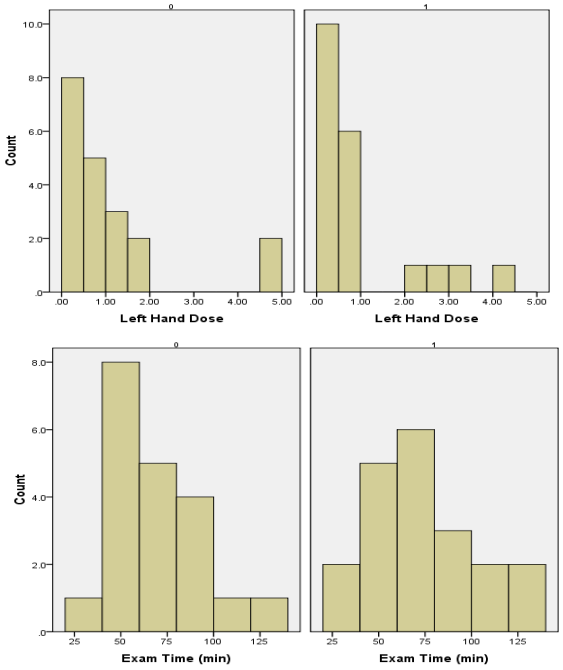
If you have time draw a similar histogram using the **extimmin** variable. Does this back up the fears about the increase in examination time?

Summary: Histograms are for displaying continuous data, e.g. height, age etc, the bars touch, signifying the continuous nature of the data. The area of the bars represent the number in each range, the bars are usually of equal widths but this need not always be the case. Histograms should be clearly labelled and the units of measure displayed. The use of Histograms compared to Bar Charts is summarised after the section on Bar Charts.

The small sample size makes it difficult to draw conclusions, however it would appear that the screen has increased the number of radiologists receiving a lower left hand dose.

The examination time also appears to be altered, more examinations appear to be taking longer.

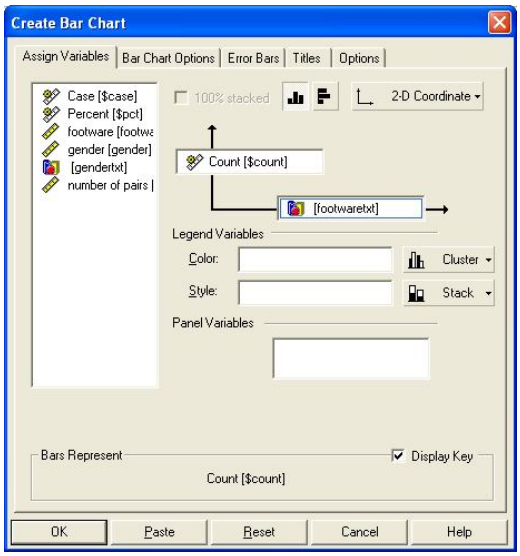
If you want to examine the data more it is worth looking at boxplots. Notice also on these graphs that the shield/no shield variable is left as 0 or1 rather than labelled - it certainly doesn't help the readability of the output!



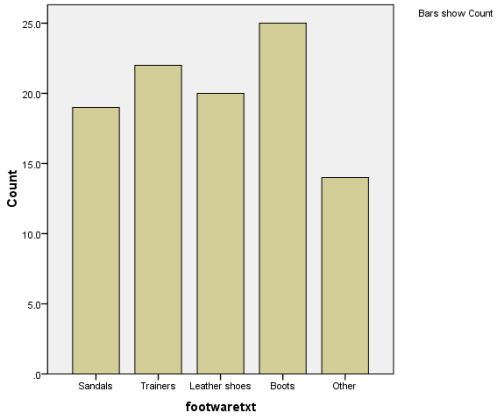
Task 5 Bar charts.

Bar charts and histograms look similar at first; there is however a definite difference in the type of data each is designed to show and this subtle difference is an important one if you are using them in your research. Bar charts are for non-continuous data, i.e. data in categories that are not related in any order. Histograms are for displaying continuous data.

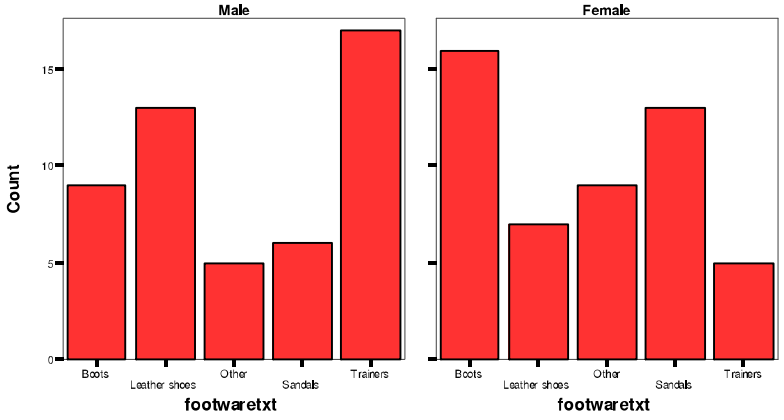
To have a go at creating a bar chart open the file called ***shoetypes.sav*** this file contains data about the type of shoes worn at the time the data were gathered and number of pairs owned by a sample of 100 people. We can use SPSS to analyse the data by using bar charts among other methods.



Drag the "footwaretxt" variable to the horizontal axis then click OK. The graph above should appear. Try again but this time drag the "gender" variable over to the **Panel Variable** box and see what happens. (notice that if you use the numerical version of this variable you might get a "Convert?" dialog box, just say yes to this to continue. You might notice a different profile between the shoe portfolios across the genders. I must confess here that these data are purely fictitious; I have it on good authority that I've seriously underestimated the number of shoes for one of the genders!



It is worth noticing that the graph can be edited after it is drawn, just double click on the graph and then click into the labels you wish to alter. An alternative to "Counting" the numbers for the bar heights is to use percentages, this is done by dragging the "Percent" variable over to the vertical axis.



Summary: Bar charts are for non-continuous data e.g. the number of people from each of five towns, the bars do not touch. Bar charts should be clearly labelled and the units of measure displayed. Bar charts and Histograms look similar, however the type of data they should be used on is different. In a Histogram the bars touch each other, this denotes the continuous nature of the data being displayed. Bar charts should be used for discrete data. If you aren't sure about the difference between continuous and discrete data look it up in the Glossary.

Test yourself; Of the following which would best be displayed in a Histogram or Bar chart. Fill in the table below, put H for Histogram or B for Bar chart in the end column.

	H or B
1 The number of students in the age groups 18-27, 28-37,38-47 etc.	
2 The number of people living in each of three towns.	
3 The number of patients visiting an Optician with short sight, long sight and no sight defect.	
4 The marks of each individual student in a class.	
5 The number of students in each range of marks in 10% intervals.	
6 The number of men vs. women in a town.	

	H or B
The number of students in the age groups 18-27, 28-37,38-47 etc. ***This is continuous data, people can have any age in a continuos range - hence use a histogram.***	*H*
The number of people living in each of three towns. ***This is not continuous data, it is discrete - use a bar chart.***	*B*
The number of patients visiting an Optician with short sight, long sight and no sight defect. ***This is discrete - the data is giving the number of patients in each of three categories. Use a bar chart.***	*B*
The marks of each individual student in a class.	*B*
The number of students in each range of marks in 10% intervals.	*H*
The number of men vs. women in a town. ***This is certainly discrete not continuos data - you could use a bar chart or in this case a pie chart may also be an option.***	*B*

Percentages.

Lets do a simple example just to check the basic principal, sometimes it's a good idea to work through the principals on a simple example.

The table shows the spending money of my three children. To find out the percentage of the total spending money each individual child receives we must first work out the total amount.

Name	Spending Money per month	Percentage of total Spending Money
Tom	8.00	
Rachel	7.00	
Jodi	5.00	

To do this, simply add up all the money in the middle column.

8 + 7 + 5 = 20 (this tells us the total amount of money)

We could say that Jodi gets five twentieths of the total money. In figures this is 5/20 or $\frac{5}{20}$
Tom gets eight twentieths of the total money. In figures this is 8/20 or $\frac{8}{20}$
Rachel gets seven twentieths of the total money. In figures this is 7/20 or $\frac{7}{20}$

We'll work on Rachel's money for the next bit…

If we want to convert this to a percentage we just multiply it by one hundred. A percentage means "*per hundred*" (cent means 100 – 100 cents make a dollar, 100 degrees on the Centigrade scale, 100 legs on a … you get the idea!) so multiplying our fraction by 100 gives the fraction of 100.

We are really saying, "*Rachel gets seven twentieths of a hundred*". To work it out, first work out one twentieth, which would be 5 or 5% (since 5 x 20 =100 we can deduce that one twentieth of 100 is 5). So each twentieth is 5%, Rachel gets seven twentieths of the total amount so that is 7*5 percent since each twentieth is worth 5% i.e. 35 percent.

The sum we have done could also be written as:

$$100 \times 7 \div 20$$

On a computer we would type 100*7/20 because the multiply and divide symbols are not on the keyboard.

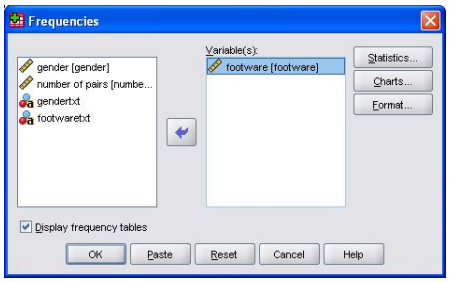
General rule for percentages of a total:

100 × the individual value ÷ the total of the values

Have a go at filling in the "Percentage of total Spending Money" column in the table above. Check they add up to 100.

Summary: Percentages show proportions, it should be clear what they are percentages of.

Using SPSS to calculate the percentage of subjects in each group.



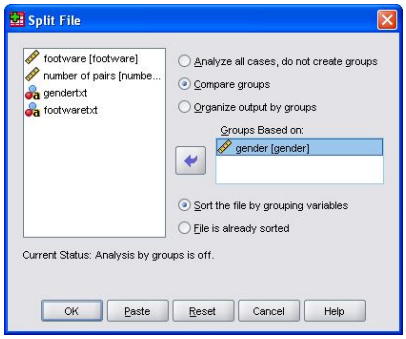
You can very quickly create summary percentages using the "frequencies" command, for example in the shoes file, what percentage of subjects were wearing each type of shoe? Clear any previous setting by clicking the "Reset" button then scoot the footwear variable into the variables box and just hit OK.

The valid percent column is the one to read, it will ignore any empty cells.

footware

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Boots	25	25.0	25.0	25.0
	Leather shoes	20	20.0	20.0	45.0
	Sandals	19	19.0	19.0	64.0
	Trainers	22	22.0	22.0	86.0
	Other	14	14.0	14.0	100.0
	Total	100	100.0	100.0	

Does the percentage of footwear types differ in the different gender grouped; the bar charts seemed to imply this...



Lets get SPSS to do everything twice, once for males and once for females, we can do this using the split file command. Choose **Data**, **Split** file.

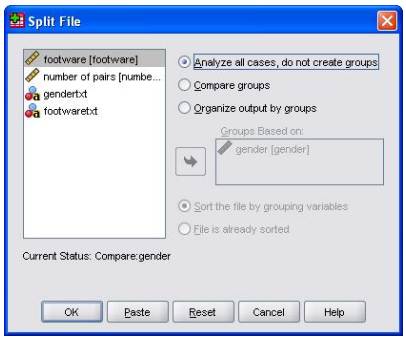
Now calculate the percentages again as you did before.

footware

gender			Frequency	Percent	Valid Percent	Cumulative Percent
Male	Valid	Boots	9	18.0	18.0	18.0
		Leather shoes	13	26.0	26.0	44.0
		Sandals	6	12.0	12.0	56.0
		Trainers	17	34.0	34.0	90.0
		Other	5	10.0	10.0	100.0
		Total	50	100.0	100.0	
Female	Valid	Boots	16	32.0	32.0	32.0
		Leather shoes	7	14.0	14.0	46.0
		Sandals	13	26.0	26.0	72.0
		Trainers	5	10.0	10.0	82.0
		Other	9	18.0	18.0	100.0
		Total	50	100.0	100.0	

The output should now be split into two groups, one for Male and one for Female. Tables like this are rarely in the ideal format for inclusion in a dissertation or paper but can be copied and pasted into a word processor and manipulated there.

Remove the split once you have done with it. If you leave it on you may get some strange results. Choose **Data**, **Split** file. Then select the "**Analyse all cases**" option, then click **OK**.



Don't forget to switch this feature off when you don't need it!

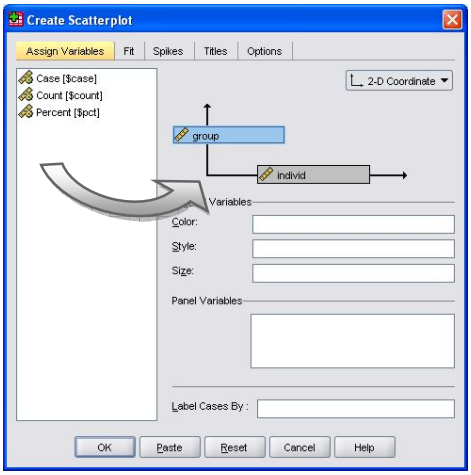
Task 6 Using Scatterplots to look for correlation

Scatterplots are used when data are paired: each point on a diagram represents a pair of numbers. Scatterplots need paired data.

- Open the data file called **Step**.

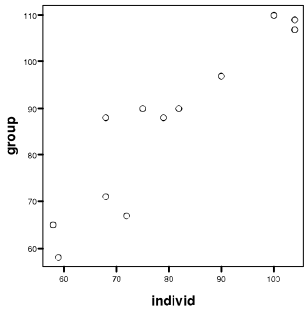
These data come from an experiment to see whether subjects could perform more step exercises in a fixed time in a group or on their own. A physiotherapy student collected them as part of a third year project.

Look at the data, you will see that the columns are of equal length, this is another indication that the data are paired. If we had the names of the twelve people who were the subject of the study we could put them in a third column, again with just twelve entries. Each row would then be one person's data, their name, the number of steps done when in a group and the numbers of steps done working alone. Sometimes you will see paired data where not all the columns have the same number of entries, this could have been so in this example if one of the subjects had failed to turn up for the group exercise.



We are going to draw a scatterplot for these two columns with the number of steps done individually on the x-axis.

To draw the scatterplot we will use the interactive graph system. Click on the SPSS **Graphs** menu then choose, (Legacy), **Interactive, Scatterplot**. Drag the "individual" variable to the horizontal axis and the "group" variable to the vertical axis. Click the **OK** button and your graph should eventually appear in the SPSS viewer.



Read about correlation in the Glossary and say what kind of correlation is involved here. The questions below may help.

Do the points appear to form a line? _____.

If they do is it a clear, quite thin line or more like a cloud? _____.

Does it slope up or down from left to right? _____.

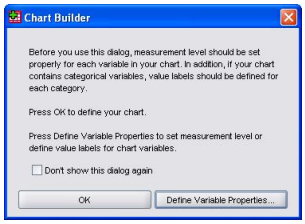
Look at your answers and decide if there is a strong, weak or no correlation. Is it positive or negative? _____.

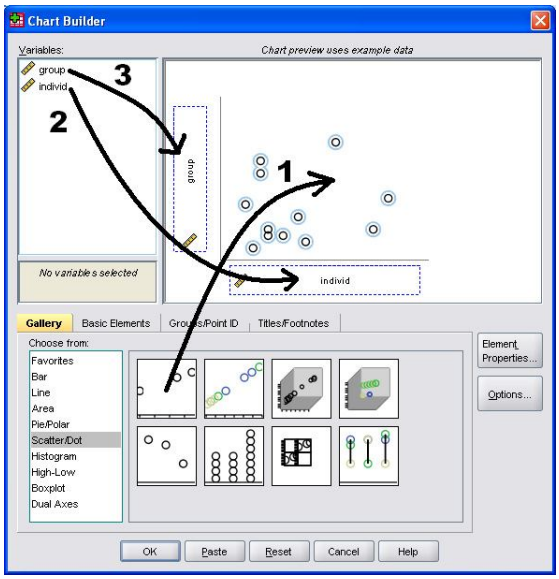
This shows fairly strong positive correlation.

The new "Chart Builder" method.

You might like to have a play with the latest way of creating charts, to recreate the scatter plot using the new "Chart Builder" feature under the Graphs menu. The intermediate advice about "measurement level" is important, but in this example no action is needed. Variables for this method have to be set at the correct measurement level for the type of graph you plan to use.

Drag the objects on the dialog in the order numbered on the illustration here.





Summary: Scatter plots are used to show paired data, where for example one person is tested under two circumstances, each individual will have a pair of readings. In this example a scatter plot can be used to indicate changes between the performance in different circumstances. Scatter plots are also typically used to show correlation. Scatter plots should be clearly labelled and the units of measure displayed.

An important note; Correlation does NOT show causality!

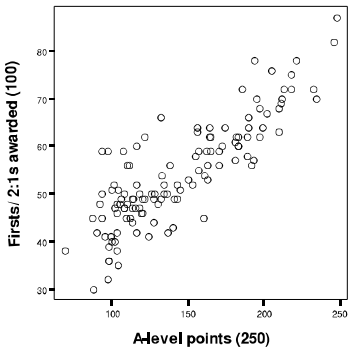
Example: The graph shows the proportion of Firsts or Upper Seconds as a measure of degree attainment, plotted against standards of A level passes obtained by new students, the data is from the Sunday times survey of HE. It is sighted as evidence that universities with an intake of students with "better" A-levels have an output of students with a higher percentage of "better" classed degrees.

Is this an appropriate way to show the data?

Is the graph labelled adequately?

What does it show?

Does this support the above argument?



Is this an appropriate way to show this data? Yes, this is paired data, one dot represents the data from one University. Is the graph labelled adequately? Not bad, but I would have liked an overall title and some indication about how the a-level scores are derived (is big = good on this scale?). What does it show? It shows that establishments with higher average A-level attainment students at intake tend to award a higher level of degree. Does this support the above argument? It appears to support the theory that universities with an intake of students with "better" A-levels have an output of students with a higher percentage of "better" classed degrees. However it is only an overall picture, it doesn't preclude the possibility that the worst A-level student could end up with the highest degree classification! It is looking at universities not students.

Correlations in SPSS (Practical)

The development of this E-Book has been supported by the British Academy.

Correlation practical

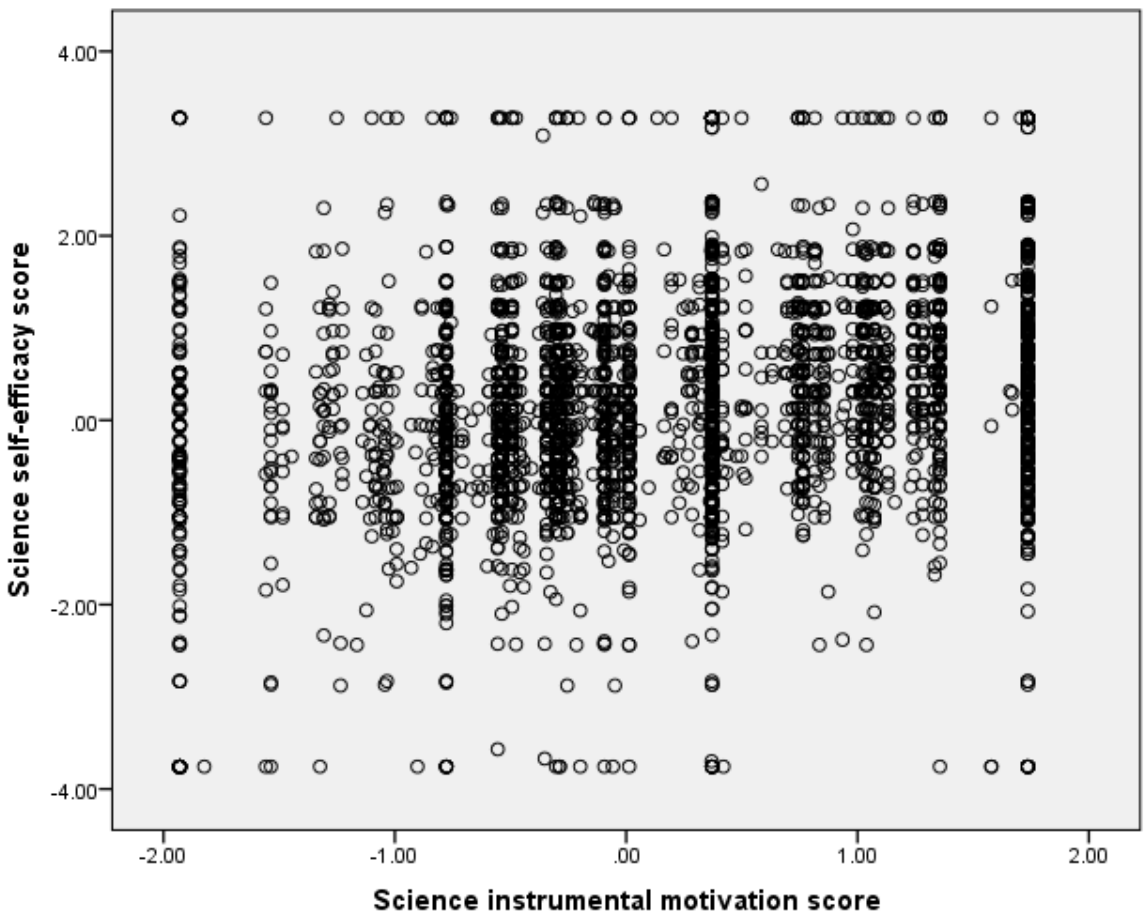
In this practical we will investigate whether there is a relationship between two variables by looking how correlated they are.

Two of the key predictors of academic achievement proposed by theories of student learning are self-efficacy and instrumental motivation. Self-efficacy refers to an individual's confidence in their ability to perform a task well, and instrumental motivation to the belief that learning will be useful for one's later career. In this practical we address the question of whether these two constructs are correlated, or specifically whether students who are more confident in their abilities in science are systematically more (or less) likely to view science learning as important for their future prospects. The PISA measure of science self-efficacy (SCIEEFF) was derived from students' responses to questions on how easy they would find it to perform eight science tasks on their own, such as "Identify the better of two explanations for the formation of acid rain". The measure of instrumental motivation (INTMOVSCI) was derived from four items in which students rated their agreement with statements like "Many things I learn in my school science subjects will help me to get a job" (see PISA datafile description for further details).

To do this we will begin by simply plotting the two variables in SPSS:

- Select **Scatter/Dot** from the **Legacy diagnostics** available from the **Graphs** menu.
- Select Simple Scatter and click on Define to bring up the Simple Scatterplot window.
- Copy the **Science self-efficacy score[SCIEEFF]** variable into the **Y Axis** box.
- Copy the **Science instrumental motivation score[INSMOVSCI]** variable into the **X Axis** box.
- Click on the **OK** button.

SPSS will then draw a scatterplot of the two variables which can be seen below:



Looking at the scatterplot there appears to be a positive correlation between the variables with larger values of **SCIEEFF** associated with larger values of **INSMOVSCI** (an upward sloping relationship) but this relationship is not that strong with possibly a few more points in the bottom-left and top-right quarters of the plot.

We want to test whether any correlation we observe in the scatterplot is significant but there are several different correlation coefficients for different situations. The first correlation coefficient that we will look at is the Pearson correlation coefficient. This correlation requires the variables to be continuous and, in smaller samples, to be normally distributed so we will firstly look at whether a normal distribution is suitable.

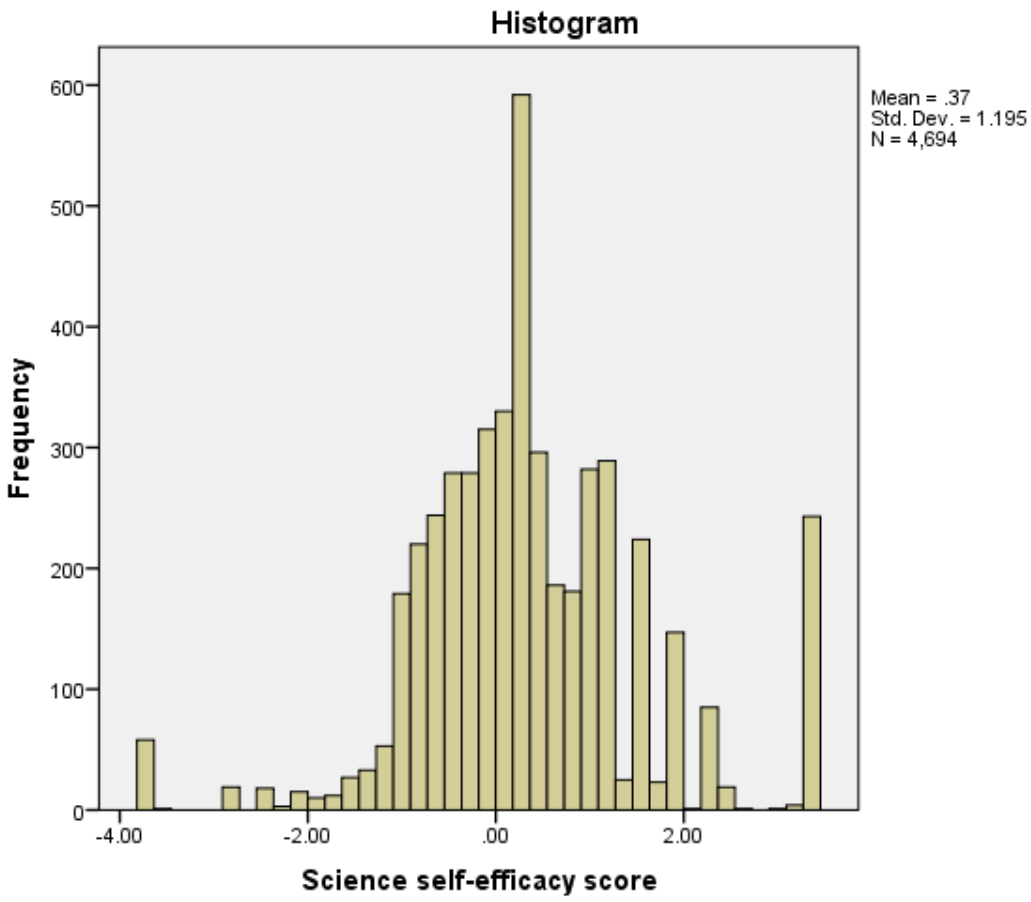
To do this we need to the following in SPSS:

- Select **Descriptive Statistics** from the **Analyze** menu.
- Select **Explore** from the **Descriptive Statistics** sub-menu.
- Click on the **Reset** button.
- Copy the **Science self-efficacy score[SCIEEFF]** and **Science instrumental motivation score[INSMOVSCI]** variables into the **Dependent List:** box.
- Click on the **Plots...** button.
- On the screen that appears select the **Histogram** tick box.
- Unselect the **Stem and leaf** button.

- Select the **Normality plots with tests** button.
- Click on the **Continue** button.
- Click on the **OK** button.

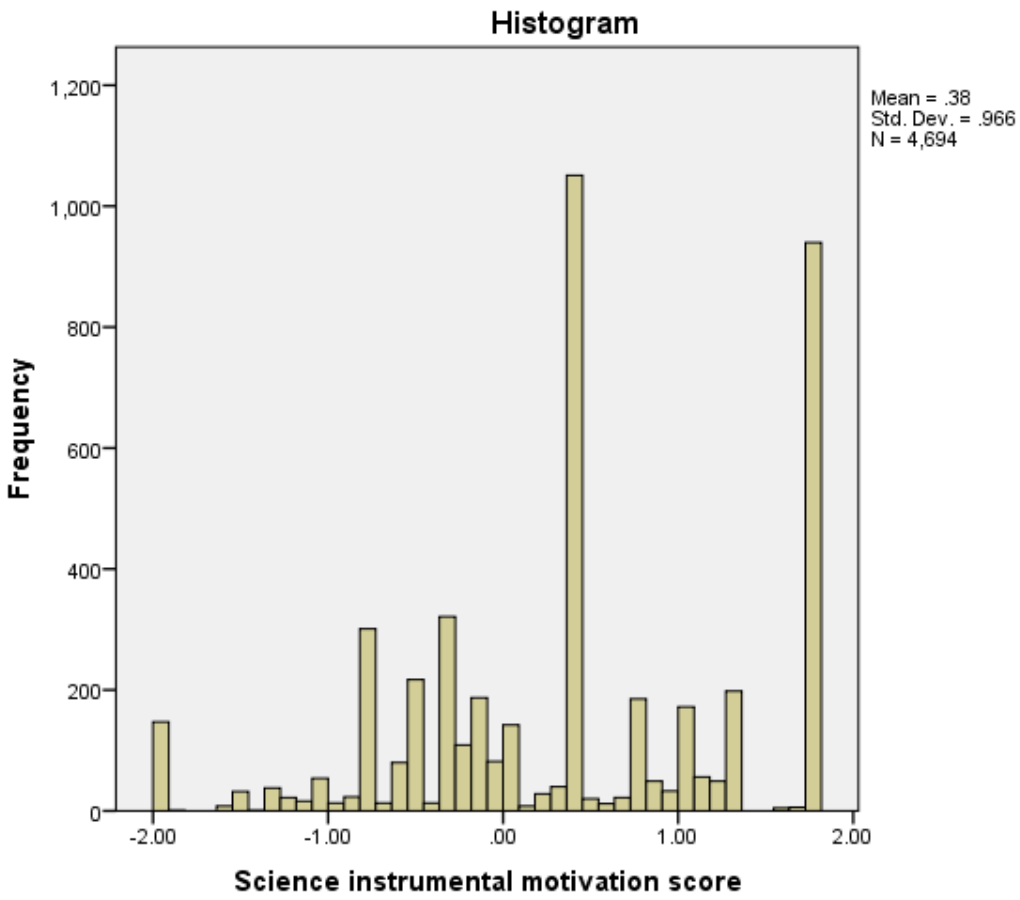
This set of instructions will create a whole list of outputs - both tables and figures - in SPSS. We will focus on two figures each for our two variables and then one table.

We will first look at a histogram of the variable, **SCIEEFF**. This can be found in amongst the set of output objects and looks as follows:



Ideally for a normal distribution this histogram should look symmetric around the mean of the distribution, in this case .3688. This distribution appears to be reasonably symmetric.

We will next look at a histogram of the variable, **INSMOVSCI**. This can also be found in amongst the set of output objects and looks as follows:



Again for a normal distribution this histogram should look symmetric around the mean of the distribution, in this case .3827. This distribution appears to be significantly skewed to the left (negatively skewed).

We will next look at statistical tests for the two variables to see if they back up our visual impressions from the histograms.

The Kolmogorov-Smirnov test is used to test the null hypothesis that a set of data comes from a normal distribution. An alternative test derived by Shapiro and Wilks is sometimes also available in SPSS but will not be described here. The available test statistics are presented in the table below that will be amongst the outputs from the Explore command:

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Science self-efficacy score	.079	4694	.000	.952	4694	.000
Science instrumental motivation score	.127	4694	.000	.940	4694	.000

a. Lilliefors Significance Correction

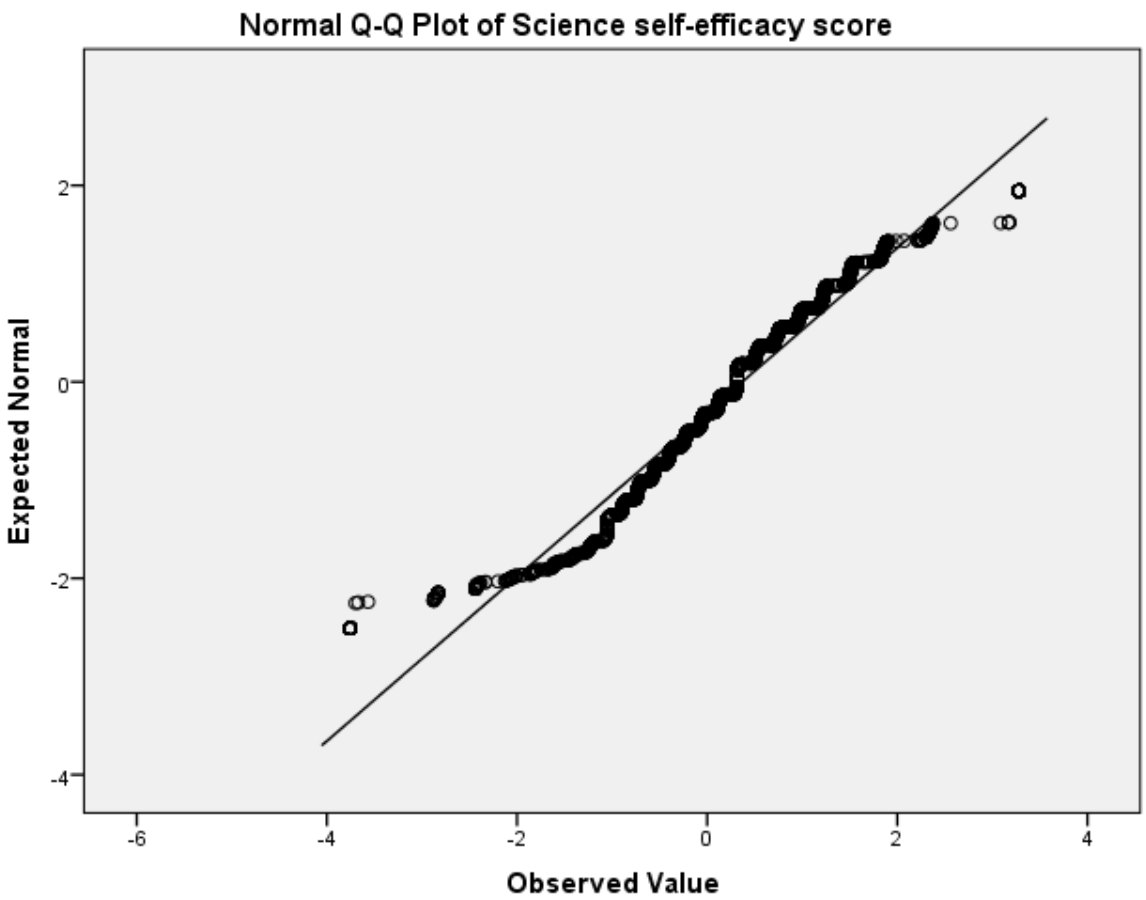
The Kolmogorov Smirnov tests produce test statistics that are used (along with a degrees of freedom parameter) to test for normality. Here we see that the Kolmogorov Smirnov statistic takes value .079 for **SCIEEFF** and value .127 for **INSMOVSCI**The test has degrees of freedom which equals the number of data points, namely 4694.

For **SCIEEFF** we see the following: The p value (quoted under Sig. for Kolmogorov Smirnov) is .000 (reported as p < .001) which is less than 0.05. We therefore have significant evidence to reject the null hypothesis that the variable follows a normal distribution.

For **INSMOVSCI** we see the following: The p value (quoted under Sig. for Kolmogorov Smirnov) is .000 (reported as p < .001) which is less than 0.05. We therefore have significant evidence to reject the null hypothesis that the variable follows a normal distribution.

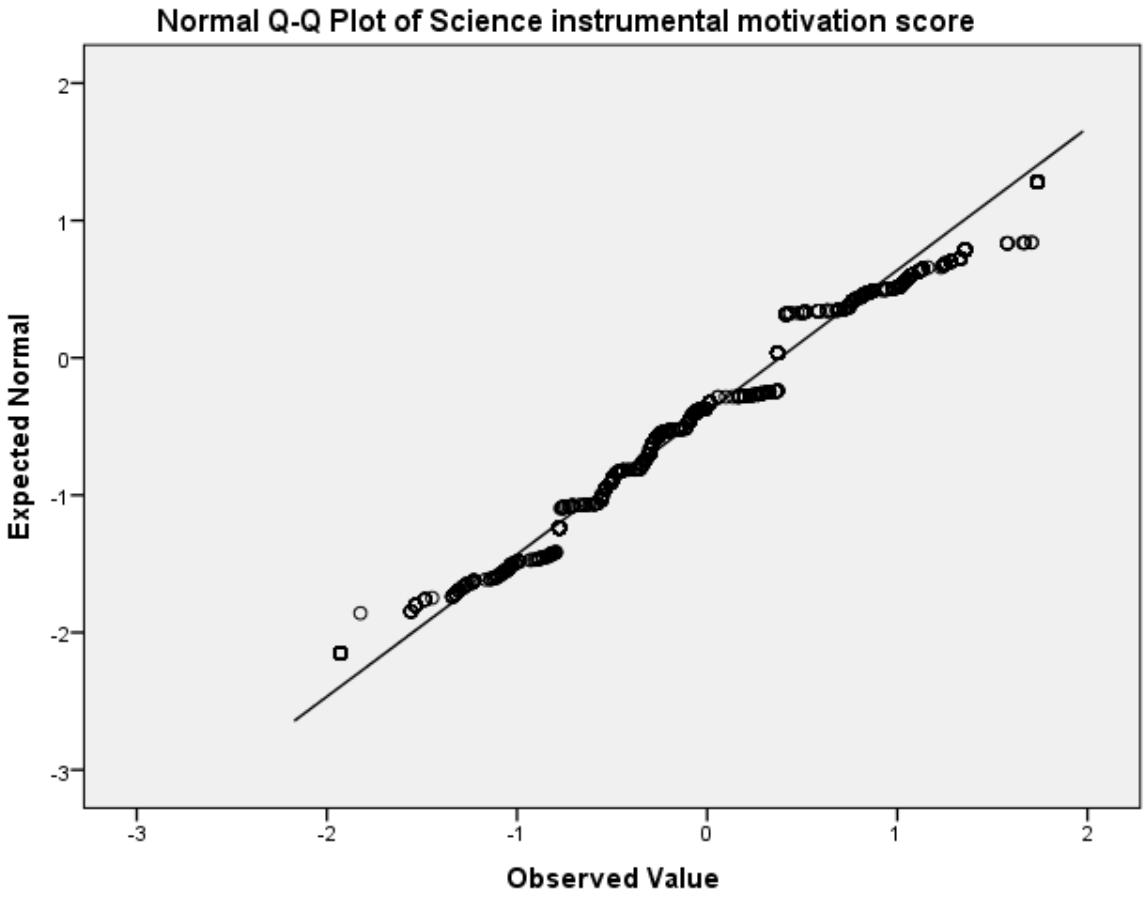
Although the Kolmogorov Smirnov test tells the researcher whether the distribution followed by a variable is statistically significantly different from a normal distribution one should take care in not overinterpreting such findings. Significance will be strongly effected by the number of observations and so only a small discrepancy from normality will be deemed significant for very large sample sizes whilst very large discrepancies will be required to reject the null hypothesis for small sample sizes.In addition, Pearson's correlation will be robust to non-normality in the data when samples are very large, as is the case here.

To complete our normality checking SPSS also produces Quantile-Quantile (or QQ) plots. We can see the one for **SCIEEFF** below:



QQ plots can be used to compare the distribution of a variable with a chosen distribution (typically a normal distribution as we are doing here). The data are plotted against a theoretical normal distribution (with the same mean and variance as the sample data) in such a way that the points should form an approximate straight line. Departures from this straight line indicate departures from normality. As we found a significant effect in the Kolmogorov Smirnov test for **SCIEEFF** we should see the points diverging from the line in the plot above with either some outlying values lying away from the line or even the shape of the points forming a non-linear pattern.

Similarly for **INSMOVSCI** its Quantile-Quantile plot can be seen below:



As we found a significant effect in the Kolmogorov Smirnov test for **INSMOVSCI** we should see the points diverging from the line in the plot above with either some outlying values lying away from the line or even the shape of the points forming a non-linear pattern.
We will now finally turn our attention to the main topic of this practical which is the calculation of the correlation between our two variables. SPSS offers several correlation coefficients and we will consider these here in turn. All three are available through the Analyse->Correlate->Bivariate option in SPSS.

- Select **Bivariate...** from the **Correlate** option available from the **Analyse** menu.
- Copy the **Science self-efficacy score[SCIEEFF]** and the **Science instrumental motivation score[INSMOVSCI]** variables into the **Variables** box.
- Click on the **Options** button and Select the **Means and Standard deviations** tick box.
- Click on the **Continue** button to return to main window.
- Click on the **OK** button.

The correlation command will produce two output tables. The first table which we show below simply gives means and standard deviations for the two variables we are comparing.

Descriptive Statistics

	Mean	Std. Deviation	N
Science self-efficacy score	.3671	1.19427	4726
Science instrumental motivation score	.3819	.96666	4791

In the next table we see the correlation matrix for the variables we are considering:

Correlations

		Science self-efficacy score	Science instrumental motivation score
Science self-efficacy score	Pearson Correlation	1	.327**
	Sig. (2-tailed)		.000
	N	4726	4694
Science instrumental motivation score	Pearson Correlation	.327**	1
	Sig. (2-tailed)	.000	
	N	4694	4791

**. Correlation is significant at the 0.01 level (2-tailed).

The Correlate option can be used for more than two variables simultaneously and will then give all correlations hence the output table is in this matrix format. The table contains three numbers for each possible correlation (including the correlations of variables with themselves which always takes the value 1). For each correlation there is an estimate of the correlation, an accompanying p value and a sample size on which the correlation has been calculated. Here we are interested in the Pearson correlation between **SCIEEFF** and **INSMOVSCI** which can be found in two places in the table - either in the row for **SCIEEFF** and column for **INSMOVSCI** or the row for **INSMOVSCI** and column for **SCIEEFF**. Note that the SPSS table repeats exactly the same information twice, but in the write-up of results it should only be reported once!

In this case the correlation (reported as the statistic *r*) takes value .327. The widely-used rules specified by Cohen regard a correlation of *r*=.1 as small, *r*=.3 as moderate, and *r*=.5 as large. Here, then, we see a moderate positive correlation. The correlation is given in the table, along with a significance value and a sample size which in this case is 4694. This is the number of observations in which both **SCIEEFF** and **INSMOVSCI** where observed.

We can test if this correlation is significantly different from zero which will depend on (i) the magnitude of the correlation and (ii) the number of observations on which the correlation is based.

The p value (quoted under Sig. (2-tailed)) is .000 (reported as p < .001) which is less than 0.05. We therefore have significant evidence to reject the null hypothesis that the correlation is 0.

We would report the result as follows: The variables **SCIEEFF** and **INSMOVSCI** were significantly and moderately positively correlated *r* = .327, N = 4694, p < .001. Note there is no need for a table when reporting a single correlation.

The Pearson correlation coefficient is appropriate to use when both variables can be assumed to follow a normal distribution or when samples are very large.
If this is not the case then an alternative is the Spearman rank correlation. This correlation works in much the same way as the Pearson coefficient but is calculated on the ranks of the data points rather than the points themselves. To calculate the Spearman correlation we need to return to the Bivariate screen and do the following:

- Select **Bivariate...** from the **Correlate** option available from the **Analyse** menu.
- Check that the **Science self-efficacy score[SCIEEFF]** and the **Science instrumental motivation score[INSMOVSCI]** variables are still in the **Variables** box.
- Deselect the **Pearson** tick box.
- Select the **Spearman** tick box.
- Click on the **OK** button.

In the table produced we see the correlation matrix for the variables we are considering:

Correlations

			Science self-efficacy score	Science instrumental motivation score
Spearman's rho	Science self-efficacy score	Correlation Coefficient	1.000	.333**
		Sig. (2-tailed)	.	.000
		N	4726	4694
	Science instrumental motivation score	Correlation Coefficient	.333**	1.000
		Sig. (2-tailed)	.000	.
		N	4694	4791

**. Correlation is significant at the 0.01 level (2-tailed).

For each correlation there is once again an estimate of the correlation, an accompanying p value and a sample size on which the correlation has been calculated. Here we are interested in the Spearman correlation between **SCIEEFF** and **INSMOVSCI** is repeated in two places in the table - either in the row for **SCIEEFF** and column for **INSMOVSCI** or the row for **INSMOVSCI** and column for **SCIEEFF**.

In this case the correlation (reported as the statistics rho) takes value .333. This represents a moderate positive correlation. The correlation is given in the table, along with a significance value and a sample size which in this case is 4694. This is the number of observations in which both **SCIEEFF** and **INSMOVSCI** where observed.

We can test if this correlation is significantly different from zero which will depend on (i) the magnitude of the correlation and (ii) the number of observations on which the correlation is based.

The p value (quoted under Sig. (2-tailed)) is .000 (reported as p < .001) which is less than 0.05. We therefore have significant evidence to reject the null hypothesis that the correlation is 0.

We would report the result as follows: The variables **SCIEEFF** and **INSMOVSCI** were significantly and moderatly positively correlated *r* = .333, N = 4694, p < .001.
The third possible correlation is known as Kendalls Tau-b and has desirable properties when the variables take values that are ordered categories (i.e. ordinal variables). To calculate the Kendalls Tau-b we need to return to the Bivariate screen and do the following:

- Select **Bivariate...** from the **Correlate** option available from the **Analyse** menu.
- Check that the **Science self-efficacy score[SCIEEFF]** and the **Science instrumental motivation score[INSMOVSCI]** variables are still in the **Variables** box.
- Deselect the **Spearman** tick box.
- Select the **Kendall tau-b** tick box.
- Click on the **OK** button.

In the table produced we see the correlation matrix for the variables we are considering:

Correlations

			Science self-efficacy score	Science instrumental motivation score
Kendall's tau_b	Science self-efficacy score	Correlation Coefficient	1.000	.240**
		Sig. (2-tailed)	.	.000
		N	4726	4694
	Science instrumental motivation score	Correlation Coefficient	.240**	1.000
		Sig. (2-tailed)	.000	.
		N	4694	4791

**. Correlation is significant at the 0.01 level (2-tailed).

As in the previous correlation tables, for each pair of variables there is once again an estimate of the correlation, an accompanying p value and a sample size on which the correlation has been calculated, all repeated in two places in the table.

In this case the correlation (reported as the statistic tau) takes value .240. This correlation is small but positive. As before, the correlation coefficient is accompanied by the sample size used in the calculation and the significance value will depend on (i) the magnitude of the correlation and (ii) the number of observations on which the correlation is based.

The p value (quoted under Sig. (2-tailed)) is .000 (reported as $p < .001$) which is less than 0.05. We therefore have significant evidence to reject the null hypothesis that the correlation is 0.

We would report the result as follows: The variables **SCIEEFF** and **INSMOVSCI** were significantly and slightly positively correlated $r = .240$, $N = 4694$, $p < .001$.
This ends our practical on correlations.

In this example, Pearson's correlation is probably the most appropriate statistic to report, given the continuous nature of the variables and the very large sample size. However, the results all agree that there is a significant positive association between science self-efficacy and instrumental motivation, but not a very strong one. Students who are confident in their science ability also tend to value science in a career, but high levels on one construct certainly do not guarantee high levels on the other.

Program Studi Pendidikan Bahasa Inggris
Fakultas Kependidikan dan Humaniora
Universitas Kristen Duta Wacana

RENCANA PEMBELAJARAN SEMESTER

MATA KULIAH	Kode Mata Kuliah	Rumpun Mata Kuliah	BOBOT (SKS)	SEMESTER	Tanggal Penyusunan
DATA ANALYSIS	KE4052	Kemampuan Melakukan Penelitian dan Menyajikannya	2	6	25 Januari 2021

OTORISASI	Dosen Pengembang RPS	Koordinator Rumpun Mata Kuliah	Kaprodi
	Adaninggar Septi Subekti, M.Sc.	Adaninggar Septi Subekti, M.Sc.	Lennuela Alvita Kurniawati, M.Hum.

Capaian Pembelajaran (CP)

CP Luaran PRODI (CPL)	
PG-I-06	Menguasai konsep metodologi penelitian ESP dan penyajian hasilnya.
KK-E-02	Mampu merancang metode penelitian yang diperlukan dalam rangka pengembangan kualitas pengajaran di kelas, mendasarinya dengan kajian pustaka serta hasil penelitian lain yang relevan, serta menyajikannya secara lisan dan tertulis.
SK-I-17	Mampu bekerja secara konsisten.

CP-Mata Kuliah (CP-MK)		Model Evaluasi
CP-MK 1	Mampu melakukan observasi untuk mencari jawaban atas research questions (PG-I-06, KK-E-02, SK-I-17)	OBSERVATION assessment
CP-MK 2	Mampu melaksanakan mini-interview dalam Bahasa Indonesia untuk mencari jawaban atas research questions (PG-I-06, KK-E-02, SK-I-17)	INTERVIEW assessment
CP-MK 3	Mampu melakukan transkripsi data interview (PG-I-06, KK-E-02, SK-I-17)	INTERVIEW assessment
CP-MK 4	Mampu menterjemahkan transkripsi interview ke Bahasa Inggris (PG-I-06, KK-E-02, SK-I-17)	INTERVIEW assessment
CP-MK 5	Mampu melakukan coding transkripsi interview dengan Thematic Analysis (PG-I-06, KK-E-02, SK-I-17)	INTERVIEW assessment
CP-MK 6	Mampu mengeksekusi formula sederhana dalam analisis data kuantitatif dalam SPSS (PG-I-06, KK-E-02, SK-I-17)	QUANTITATIVE ANALYSIS assessment
CP-MK 7	Mampu merefleksikan methods yang sudah dipelajari dalam kaitannya dengan riset akhir (PG-I-06, KK-E-02, SK-I-17)	REFLECTION
CP-MK 8	Mampu menjelaskan proses data analisis untuk rencana riset akhir	Final test

Deskripsi Singkat Mata Kuliah	This course is aimed at facilitating learners to have hands-on experience on analysing various data through mock-data analysis process. This includes conducting interviews, observations, and distributing questionnaires and analysing the obtained data in relation with research questions. By the end of the course, students are able to: 1) conduct interviews and analyse interview data using thematic analysis, 2) conduct observation using field notes and report the findings, 3) prepare questionnaires, distribute them, record obtained data in SPSS 20, execute descriptive statistics and correlation formula on the data, and interpret the findings.
Materi Pembelajaran/ Pokok Bahasan	Melakukan interview dan analisis data interview Melakukan observasi dan analisis data hasil observasi Menyebarkan kuesioner terbatas dan input data kuesioner Analisis data kuesioner
Pustaka	**Pustaka utama** Easwaramoorthy, M., & Zarinpoush, F. (2006). Interviewing for research. Imagine Canada, 1–2. Ho, L.-Y. (2020). Adapting your qualitative methods course for online learning. Studybay. https://studybay.com/blog/how-to-write-an-observation-report/ McGrath, C., Palmgren, P. J., & Liljedahl, M. (2018). Twelve tips for conducting qualitative research interviews. Medical Teacher. https://doi.org/10.1080/0142159X.2018.1497149 **Pustaka pendukung** Gillham, B. (2011). Developing questionnaire (2nd ed.). Continuum. Strategies for qualitative interviews. (n.d.). Retrieved January 17, 2021, from https://sociology.fas.harvard.edu/files/sociology/files/interview_strategies.pdf
Media Pembelajaran	PowerPoint, Ms Word, Youtube videos, SPSS, Active Presenter
Dosen Pengajar	Adaninggar Septi Subekti, M.Sc. Email: adaninggar@staff.ukdw.ac.id
Persyaratan Mata Kuliah	Research Methodology in ELT
Komponen Penilaian	1. OBSERVATION (Observation document and recorded presentation on doing observation) 20% 2. INTERVIEW (Interview document and recorded presentation on interviewing) 25% 3. QUANTITATIVE ANALYSIS (Performing some SPSS formula & submitting *Google Form* questionnaire) 25% 4. REFLECTION (on conducting interview, observation, and quantitative analysis) 15% 5. FINAL TEST (Recorded presentation of data analysis of future *skripsi)* 15% **TOTAL** **100%**
Metode Pembelajaran	1. Kuliah/Transfer Knowledge (TCL) 2. Self-Directed Learning (SDL)
Standar Acuan Penilaian	A : 90,0 - 100 A- : 85, 0 - 89,9 B+ : 80, 0 - 84,9 B : 75, - 79, 9 B- : 70,0 - 74,9 C+ : 65,0 - 69, 9 C : 60,0 - 64,9 D : 55 - 59,9 E : < 55
	Beberapa informasi penting 1. Penggunaan Google-Translate atau software terjemahan apapun diperbolehkan untuk membantu terjemahan transkripsi interview, namun hasil akhir terjemahan harus baik secara kebahasaan 2. Umumnya tugas dikumpulkan via e-class dengan **deadline: Rabu pukul 23.59** kecuali ada instruksi lain. 3. **Yang terpenting,** kuliah ini menekankan pada **hands-on experience** dalam menganalisis data, karena itu semua assessment (kecuali FINAL TEST) menekankan pada sejauh mana mahasiswa tidak saja memahami konsep metode penelitian tapi juga benar-benar melaksanakan proses analisis data dari awal sampai akhir

Minggu No	Tanggal	Sub-CP-MK	Indikator	Kriteria & Bentuk Penilaian	Metode Pembelajaran [Estimasi Waktu]	Materi Pembelajaran [Pustaka]	Bobot Penilaian (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Thursday, 4 February	Introduction, research questions investigated using observation: using field notes, reporting results of observation	Field notes and observation checklist		Online/Zoom - TCL, SDL	Ho (2020)	
2	Thursday, 11 February	Observation: using field notes, reporting results of observation	Field notes and observation checklist, observation report draft		Online/Zoom - TCL, SDL	Ho (2020)	
3	**Thursday, 18 February**	**Submitting recorded presentation on doing observation, submitting observation documents**	**OBSERVATION assessment**	**Rubrics**	Online/Zoom - TCL, SDL		**20%**
4	Thursday, 25 February	Research questions investigated using interviews, steps of interview data analysis, **homework: conducting interviews (10-15 minutes)**	Making interview checklist		Online/Zoom - TCL, SDL	Easwaramoorthy & Zarinpoush (2006), McGrath et al. (2018), Strategies for qualitative interviews	
5	Thursday, 4 March	Interview, interview transcript, thematic analysis, mini-interviewing, transcribing	Interview transcriptions		Online/Zoom - TCL, SDL	Easwaramoorthy & Zarinpoush (2006), McGrath et al. (2018), Strategies for qualitative interviews	
6	**Saturday, 13 March**	Transcribing interview transcript, translating transcripts, coding using Thematic Analysis	Interview transcriptions and the translated/English versions		Online/Zoom - TCL, SDL	Easwaramoorthy & Zarinpoush (2006), McGrath et al. (2018), Strategies for qualitative interviews	
7	Thursday, 18 March	Transcribing interview transcript, translating transcripts, coding using Thematic Analysis	The English transcriptions that have been coded; drafts of themes in relation with RQs		Online/Zoom - TCL, SDL	Easwaramoorthy & Zarinpoush (2006), McGrath et al. (2018), Strategies for qualitative interviews	
8	**Thursday, 25 March**	**Submitting recorded presentation on interviewing, submitting interview documents**	**INTERVIEW assessment**	**Rubrics**	Online/Zoom - TCL, SDL		**25%**
9	Thursday, 8 April	Developing questionnaires (translating existing questionnaire)	Making Google Form questionnaire in the Indonesian language (close-ended questions)		Online/Zoom - TCL, SDL	Gillham (2011), Youtube videos	
10	Thursday, 15 April	Developing questionnaires (translating existing questionnaire); **homework: distributing questionnaires**	Making Google Form questionnaire in the Indonesian language (close-ended questions)		Online/Zoom - TCL, SDL	Gillham (2011), Youtube videos	
11	Thursday, 22 April	Statistics: recording data into SPSS	Downloaded Excel File containing online questionnaire data, SPSS file containing the transferred Excel data		Online/Zoom - TCL, SDL	Gillham (2011), Youtube videos	
12	Thursday, 29 April	Statistics: performing reliability test, descriptive analysis and correlation formula	SPSS data and output		Online/Zoom - TCL, SDL	Gillham (2011), Youtube videos	
13	Thursday, 6 May	Statistics: performing reliability test, descriptive analysis and correlation formula	SPSS data and output		Online/Zoom - TCL, SDL	Gillham (2011), Youtube videos	

14	**Thursday, 27 May**	**Submitting recorded presentation on executing SPSS formula, submitting quantitative documents (GForm links, SPSS file, etc.),** explanation about REFLECTION assessment	**QUANTITATIVE ANALYSIS assessment**	**Rubrics**			**25%**
15	**Thursday, 3 June**	Q&A about data analysis, explanation about the final test, **submitting written reflections**	**REFLECTION assessment**	**Rubrics**			**15%**
16	**Thursday, 10 June**	**Recorded presentation of data analysis of future skripsi (FINAL TEST) - 15%**	**FINAL TEST**	**Rubrics**			**15%**

Course : **DATA ANALYSIS**
Student's name : **[.....]**
Assignment : **Final Reflection**

My Reflection on Conducting Observation/ Interviews/ Quantitative Analysis

[Revise the above title as necessary]

[Always refer to Reflection rubrics to score high]

Some guiding questions (observation):

1. How easy/difficult is it to conduct online observation for research purposes?
2. What are the challenges that you face when conducting online observation?
3. Do you learn any new things? What are they?
4. And many more

Some guiding questions (interviews):

1. How easy/difficult is it to formulate interview checklist?
2. Explain your experience in finding the participants.
3. How do you do your interviews? Is it easy? Difficult? Elaborate.
4. How is it to transcribe the interview data?
5. How is it to translate your transcriptions?
6. Is coding the transcript and naming the themes easy or difficult? Explain.
7. And many more

Some guiding questions (quantitative analysis):

1. How is your experience in finding the participants to fill your online questionnaire?
2. How difficult/easy is it to conduct quantitative analysis using SPSS?
3. What are the challenges that you face when conducting this mini research?
4. Do you learn any new things? What are they?
5. And many more

[Delete this page in your reflection]

Course : DATA ANALYSIS
Student's name : [.....]
Assignment : Final Reflection

Reflection Template:

[Title]

[Thesis Statement: In the following paragraphs.....]

[Body Paragraphs – minimum four paragraphs – Always begin with A TOPIC SENTENCE; CONCLUDING SENTENCE is optional]

The first is related to.....

The second is....

Thirdly ...

Finally...

WORD COUNT: minimum 700 words

DATA ANALYSIS CLASS
2020/2021

Reflection Paper Rubrics student's name: _____

Score	Details of reflection in relation with data analysis	Organization	Language Use
5	Reflection shows that the writer is deeply engaged in the process of analyzing data seen from very detailed and extensive elaboration on experiences (e.g.: duration, difficulties, solutions, new things to learn). **2X**	Is well organized and well developed. Displays unity, progression and coherence	Displays consistent facility in the use of language, demonstrating syntactic variety, appropriate word choice and idiomaticity, though it may have minor lexical or grammatical errors
4	Reflection shows that the writer is quite engaged in the process of analyzing data seen from quite detailed elaboration on experiences (e.g.: duration, difficulties, solutions, new things to learn). **2X**	Is generally well organized and well developed, Displays unity, progression and coherence, though it may contain occasional redundancy, digression, or unclear connections	Display facility in the use of language, demonstrating syntactic variety and range of vocabulary, though it will probably have occasional noticeable minor errors in structure, word form or use of idiomatic language that do not interfere with meaning
3	Reflection shows that the writer is fairly engaged in the process of analyzing data seen from somewhat superficial elaboration on experiences (e.g.: duration, difficulties, solutions, new things to learn). **2X**	Displays unity, progression and coherence, though connection of ideas may be occasionally obscured.	May demonstrate inconsistent facility in sentence formation and word choice that may result in lack of clarity and occasionally obscure meaning. May display accurate but limited range of syntactic structures and vocabulary
2	Reflection shows that the writer is engaged in the process of analyzing data at insufficient level seen from superficial and incomplete elaboration on experiences (e.g.: duration, difficulties, solutions, new things to learn). **2X**	Inadequate organization or connection of ideas	A noticeably inappropriate choice of words or word forms. An accumulation of errors in sentence structure and/or usage
1	-	Little or no detail, or irrelevant specifics, or questionable responsiveness to the task	Serious and frequent errors in sentence structure or usage

Total points = 20

Minimum points to pass = 12

OBSERVATION DOCUMENTS

	5	4	3	2
Documents/Artifacts	Student can provide very detailed field notes, pictures, details on locations relevant to RQs, and others	Student can provide necessary documents that contain sufficient amount of data with fair degree of details to answer RQs	Student can provide necessary documents but they contain somewhat insufficient amount of data to answer RQs	The documents contain very minimum amount of data that little information can be drawn from the documents to answer RQs

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INTERVIEW DOCUMENTS

	5	4	3	2
Documents/Artifacts	**COMPLETE ARTIFACTS and FINISHED** Complete documents (Research questions, guiding questions, Indonesian transcript, English translation, coded English transcript, consent form), which are considered done well, interview recording file is available	**COMPLETE ARTIFACTS and ALMOST FINISHED** Complete documents (Research questions, guiding questions, Indonesian transcript, English translation, coded English transcript, consent form), which are considered almost done, interview recording file is available	**INCOMPLETE ARTIFACTS and NOT FINISHED** All documents except coded transcripts are complete, interview recording file is available	**INCOMPLETE ARTIFACTS and NOT FINISHED** Students can provide recording file but cannot provide transcription, translation, and coding of interview results

If students cannot provide interview recording file, the student will be given a straight zero.

Only students who have tried to code the interview transcripts can achieve 4 points for each category

INTERVIEW DOCUMENTS

	5	4	3	2
Documents/Artifacts	**COMPLETE ARTIFACTS and FINISHED** Complete documents (Research questions, guiding questions, Indonesian transcript, English translation, coded English transcript, consent form), which are considered done well, interview recording file is available	**COMPLETE ARTIFACTS and ALMOST FINISHED** Complete documents (Research questions, guiding questions, Indonesian transcript, English translation, coded English transcript, consent form), which are considered almost done, interview recording file is available	**INCOMPLETE ARTIFACTS and NOT FINISHED** All documents except coded transcripts are complete, interview recording file is available	**INCOMPLETE ARTIFACTS and NOT FINISHED** Students can provide recording file but cannot provide transcription, translation, and coding of interview results

If students cannot provide interview recording file, the student will be given a straight zero.

Only students who have tried to code the interview transcripts can achieve 4 points for each category

PERFORMING QUANTITATIVE ANALYSIS ON SPSS

	5	4	3	2
Documents/Artifacts	**DATA INPUT IS FINISHED WELL** Students can show the SPSS document on his/her work and all the data from questionnaire have been recorded based on RQs with an arrangement that is easy to observe. Filled Indonesian version of questionnaire is available. Students can provide 15 filled questionnaires.	**DATA INPUT IS FINISHED** Students can show the SPSS document on his/her work and all the data from questionnaire have been recorded based on RQs with an arrangement that is easy to observe. Filled Indonesian version of questionnaire is available. Students can provide 15 filled questionnaires.	**DATA INPUT IS NOT FINISHED** Students can show the SPSS document on his/her work and only several data from questionnaire have been recorded based on RQs with arrangement that is somewhat confusing. Filled Indonesian version of questionnaire is available. Students can provide less than 15 filled questionnaires.	**DATA INPUT IS NOT FINISHED** Students can show the SPSS document on his/her work but only few data from questionnaire have been recorded based on RQs with arrangement that is somewhat confusing. Filled Indonesian version of questionnaire is available. Students can provide less than 15 filled questionnaires.
Mastery of SPSS formula	Student can perform SPSS formula (descriptive statistics and correlation) and interpret the results well	Student can perform SPSS formula (descriptive statistics and correlation) and interpret the results sufficiently	Student can perform SPSS 's one formula (descriptive statistics or correlation) and interpret the results sufficiently with a bit of struggle	Student struggles to perform SPSS formula (descriptive statistics, correlation) and struggle in interpreting the results

Note

If students cannot provide filled Indonesian version of questionnaire, it is assumed that he/she does not distribute the questionnaire and he/she will be given a straight zero.
Only students who have finished data input on SPSS can achieve 4 points in *Document/Artifacts* criteria.

REFERENCES

Some parts of this module are taken from the following sources.

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McGrath, C., Palmgren, P. J., & Liljedahl, M. (2018). Twelve tips for conducting qualitative research interviews. *Medical Teacher*. https://doi.org/10.1080/0142159X.2018.1497149

Strategies for qualitative interviews. (n.d.). Retrieved January 17, 2021, from https://sociology.fas.harvard.edu/files/sociology/files/interview_strategies.pdf

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