

Research Writing
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Lecture – 18
Presenting Quantitative Data

Welcome back to the MOOC course on research writing. My name is Aradhna Malik, and I am helping you with this course and we were in the process of discussing how to write up your section on methodology and data and you know. So, that that is what we are discussing right now. So, let us see what we have for you here. Today I am going to talk about or in this lecture I will talk to you about presenting quantitative data, and the next lecture I will discuss how you can present qualitative data in your work.

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The challenges of presenting quantified data
(Thody, 2006)

- “Quantification obviously reduces data but you need to avoid both too much reduction and too little
- The extent to which you influence readers’ inferences from your data will be affected by how you choose to display it and by the text that accompanies the quantified formats
- The quantified data may need supporting proof from raw data, mathematical workings and statistical techniques to demonstrate how you gathered and reduced your data, found correlations and established the robustness of your findings”

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130

So how do you present quantitative data? Before we talk about presenting quantified data not quantitative data, but data that has been quantified even for the purpose of qualitative research, we must understand the challenges of presenting quantified data, data that has been measured and has acquired the shape of something measurable something that can be presented in the form of numbers and figures etcetera. So, you know by quantification we mean something that has been measured in some standard manner. Now this is from a book by Angella Thody published in 2006 so this is the material from that book.

Ah the first challenge is that quantification; obviously, reduces data, but you need to avoid both too much reduction and too little you much understand how much data to reduce, where to reduce the data, where to present the reduced data. And how to you know how much to reduce the data and what to live out and what to include. So, you should not reduce the data too much and you should not also present too little data. Then the extent to which you influence readers inferences from your data will be affected by how you choose to display it and by the text that accompanies the quantified formats.

We cannot present data just in tables in quantified form, any quantified data or any quantified presentation of data needs to be accompanied by some form of text and how you it is your purpose as a writer to direct the readers attention, towards what you towards the knowledge that you have built or towards your contribution to the knowledge base. Now how you do it depends on or how well you are able to do it depends on, how you influence, how what the readers infer or interpret or draw from the way you have presented your data. So, and how you have explained that data or how you have described that data, how you have put the tabulated form of quantified data into the text.

The quantified data may need supporting proof from raw data. Mathematical workings and statistical techniques to demonstrate how you gathered and reduced your data found correlations and established the robustness of your findings. We do not present raw data when we present data, we are talking about the analysis part now when we analyse the data and present the analysis. We do not give all details of all the raw data we have collected, we may have collected raw data for 400, 500, 100, 2000 you know data points; however, we do not put all that into the paper or into the document that we are writing we reduce the data, we manage the data, we organize the data.

Now, the process of organization of this data, the process of data reduction must be explained in as clear terms as possible for the reader to understand how you arrived at the analysis that you have arrived at. So, this must be indicated you know whatever you are presenting there must be supported by appropriate mention of the techniques that were used to reduce the data and the method that was used to reduce that data.

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The challenges of presenting quantified data

(Thody, 2006)

- “Language and style in quantitative presentations require as much attention as in qualitative or narrative presentations
- Ethics need consideration because research proved numerically appears to have unassailable realism and certainty. Most readers are only too ready to believe figures even if they are poorly presented or inaccurate (deliberately or accidentally)
- The appearance and placement of quantified data affect readers’ interest and comprehension of your data”

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Then the language and style in quantitative presentations require as much attention as in qualitative or narrative presentations. How you reduce the data, how you presented the language you use is of utmost importance. I have been asked by my students as to why I emphasize so much on language and grammar and presentation and the syntax and the words that are used. The words give the reader an idea as to what you really want the reader to derive from the presented data.

So, numbers can be read by everybody, but how those numbers should be read in what conclusion should be drawn from those numbers, depends on the language that you use the style that you use, the style of writing that you use, the format of writing that you use the genre that you use. So, all of those things are very important and using appropriate grammar is very, very important because when you use appropriate grammar, the reader gets an idea as to what as to the clarity of whatever you are saying in your mind. The clearer the readability is or the readable the more readable the material is the easier it is for the reader to understand as to what you are getting at. So, that is very, very important.

Ethics need consideration because research proved numerically appears to have unassailable realism and certainty. Most readers are only too ready to believe figures even if they are poorly presented or inaccurate, deliberately or accidentally. So, we must present data that can be replicated. The reduction must be in such a way that any person with the same amount of information and knowledge within the within a similar context

is able to draw similar conclusions, why because numbers seem more believable they seem more tangible, they seem more robust, they may or may not be, but numbers are accompanied with explanations seem much more robust than explanations themselves. And they are more believable and the reader is more easily convinced by what you are saying if numbers are there.

This is not to undermine the importance of qualitative research. I have already delivered a series of lectures on qualitative research methods through the NPTEL forum, you might want to go through that if you are interested in knowing. What qualitative research is all about there are lots of other you know lots of eminent professors who have talked about qualitative research and who have delivered exceptional a lectures and through the npTEL forum also. So, qualitative research has its own place, but numbers have you know seem much more believable.

So, one must be very, very careful when dealing with numbers and especially were presenting numbers. So, the idea is or the acid test is that anyone with the same amount with the raw data with access to the data that you had with who processes the raw data the way you have within a similar context will arrive at similar conclusions; that you have arrived at. We will discuss more about this when we talk about ethics of presenting research in the last week of classes.

Then the appearance and placement of quantified data affect the readers interest and comprehension of your data. Long drawn out tables with bad fonts are very difficult to read. So, the reader the you know tables need to be concise, precise they need to be broken up tables running into more than one page are usually they skip the readers interest now in some cases that must be that that has to be done we can not prevent that, but to the extent possible.

If all the information that you put in one table is on one page and can be seen in one shot; that really helps the reader get a better view or that keeps the readers interest anchored to whatever is being discussed, how the data appears, how the data is placed within the table, how it is discussed later outside the table has a significant impact on how well the reader receives it and how well the reader is able to understand it or comprehend it or make sense of it.

(Refer Slide Time: 09:09)

Deciding when and how to quantify data
(Thody, 2006)

- People: How far is your audience likely to understand your data unaided?
- Purposes: How much do you want to influence the way your readers/listeners interpret your data?
- Precedents: What is considered the norm for the particular type of publication or presentation or subject? ... Expository text can be used to illuminate the voices of those who have appeared only as mere numbers in a table.
- Practicalities: How much space can you allow for explanations? How many words can you save by non-repetition of data in tables and text? How close to the table can the explanation be set?"

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Now, how do you decide when and how to quantify data? People how far is your audience likely to understand your data unaided, these are some of the questions you must ask. When you quantify data yes you provide explanations, but the way you present it should be such that; people should be able to understand or make sense of what you are trying to say through the table through your info graphics things that we will discuss soon enough.

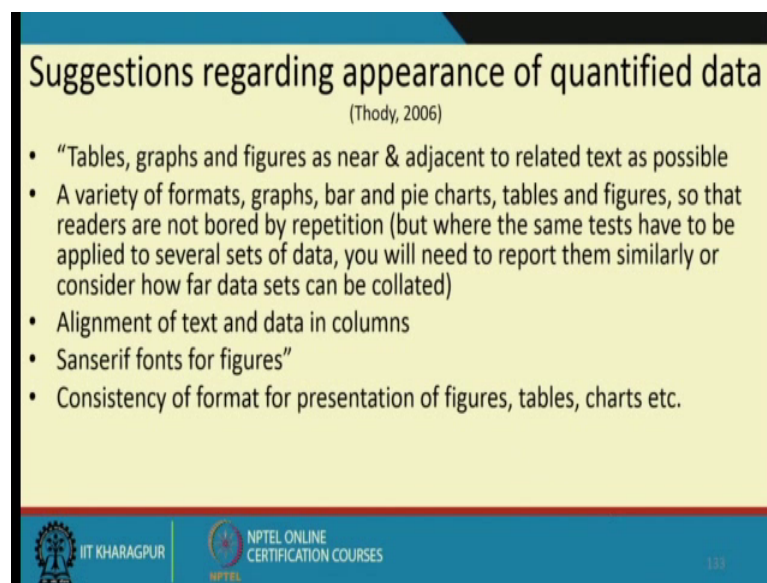
As to what it is that you are trying to say without having to read the explanation, purposes how much do you want to influence the way your readers or listeners interpret your data. So, how much influence do you want to have on your readers or on the way your readers or listeners interpret your data that will also help you decide how you want to quantify the data.

Precedents, again you know what has been done before? What is considered the norm for the particular type of publication or presentation or subject expository text can be used to illuminate the voices of those who have appeared only as mere numbers in a table many times, some portions of a table just highlight some numbers, but we are not able to explain them or their significance does not come through when we read the table. Now those points can be highlighted in your expository text which is the description that you write about the table and practicalities.

How much space can you allow for explanations. Now when we write a document we usually have a word limit. Ah you know in your own institutes you must be having a limit on the number of pages your dissertation can run into, you must be having a limit on the number of words that you can write for in an article for it to be submitted to a particular type of journal. So all of these things pose severe limitations on how much we are able to explain.

Now these are the practical aspects, how many words can you say it by non repetition of data in tables and text? Sometimes we need to repeat everything sometimes we only need to highlight the points. They these significant points, how close to the table can the explanation be set? So, all of these things are need to be considered, how you quantify your data? And when you quantify your data? And where you place it in your document?

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Suggestions regarding appearance of quantified data
(Thody, 2006)

- “Tables, graphs and figures as near & adjacent to related text as possible
- A variety of formats, graphs, bar and pie charts, tables and figures, so that readers are not bored by repetition (but where the same tests have to be applied to several sets of data, you will need to report them similarly or consider how far data sets can be collated)
- Alignment of text and data in columns
- Sanserif fonts for figures”
- Consistency of format for presentation of figures, tables, charts etc.

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Some suggestions regarding the appearance of quantified data again all of this is information garnered from Thody’s book. Um tables graphs and figures must be as near and as adjacent to the related text as possible. A variety of formats graphs bar and pie charts tables and figures; so that readers are not bored by repetition, but where the same tests have to be applied to several sets of data you will need to report them similarly or consider how far data sets can be collated. So, you might want to combine data sets, you might need to repeat them, but to the extent possible have some variety in the way you present your data. So, that the readers attention is anchored with the text.

Alignment of text and data in columns, again this is the actual nuts and bolts of presentation. You know how you align the data and text to columns sometimes you may need to use a narrower font, I remember during my own dissertation days I made a tables that ran into 3 pages. And even the table that was confined to one page did not fit in within the margins specified for submitting the dissertation.

So, what I did was in order to shrink the space or create more space; instead of using arial font, which is what I was using for my tables, I used arial narrow; now that cut down on this space this is just an example I am not trying to promote the use of any font, but then that is seems to work in my case because the table was too large, but then I had to do it across all tables, so all the tables that were you know on that full page were in arial narrow font; so that more space could be created for more information to fit in, but then that was the case when the (Refer Time: 13:24) space that was required was very little, sometimes you are just not able to do it.

The point here that the appearance needs to be such that; it aids the readability and information is not also lost. So, you have to work you know whatever you present has to go through many iterations ok. Ah Sanserif font for figures, now I am I hope you know the difference between Serif and Sanserif Serif fonts are fonts that have an edge for example, I will just show you for those of you who do not know. Now this font is Sanserif and this is I will just show you what a serif font looks like. The most commonly used serif font is times new roman. Now when you see the difference between these 2 please focus on this screen. When you see the difference between these 2 you will, see that this portion right here you know there are these little edges; oh I am sorry hold down I will have to do like this ok.

There are little edges here um. So, there is a little edge over here very tiny edge here, then there is an edge here, there is an edge here. Now these fonts do not have those tapering edges. So, these fonts are Sanserif serif fonts have these little edges at the side now for figures Sanserif fonts make it easier. So, Sanserif fonts example of Sanserif fonts could be arial Calibri Verdana etcetera. So, these are the Sanserif fonts. So, these fonts make for easier reading. And the last point in these suggestion is the consistency of format for presentation of figures tables charts etcetera. You must be consistent in the way you present your tables the table headings, the fonts that you use the fonts size that

you use the spacing that you use the formats that you use. So, all of that needs to be very, very consistent throughout your document.

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The slide is titled "Reducing data" with a citation "(Angell, 2007)" in parentheses. It features a bulleted list defining infographics and listing five types of visual formats. The slide has a yellow background with a blue header and footer. The footer includes the IIT Kharagpur logo and the NPTEL Online Certification Courses logo.

Reducing data (Angell, 2007)

- Infographics: "Visual designs that present numerical or statistical information in a condensed visual format."
 - Tables
 - Line and area charts
 - Pie charts
 - Bar graphs
 - Gantt charts

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Now, some reducing data how do we reduce data? We reduce data through the use of info graphics. Info graphics are visual designs that present numerical or statistical information in a condensed visual format. Various types of info graphic info informational graphics, to way to remember what this word means is info graphics means informational graphics. So, let us see what these are some examples are tables line and area charts, pie charts, bar graphs and Gantt charts.

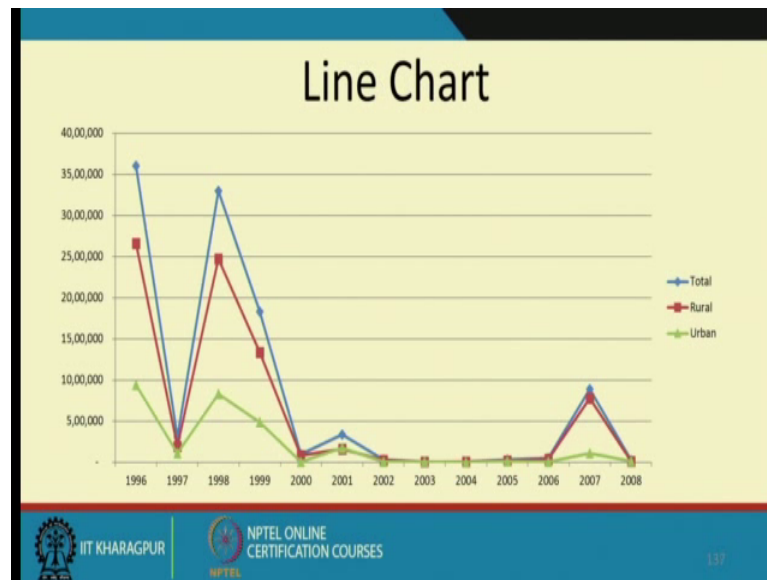
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Selection of infographics (Angell, 2007)	
Message	Visual Channel
Demonstrate how a relative portion compares to the whole	Pie chart
Show relationships, similarities, or different pieces of information, objects or ideas	Bar/ Line chart
Depict the progress or status of information or events over time	Line chart
Rank the importance or size of an idea, event, or object	Bar chart
Present specific numeric information or brief comparative text	Table
Chart the duration of scheduled activities for a project/ task	Gantt chart

Now, where do you use these info graphics? And how do you use these info graphics? To demonstrate how a relative portion compares to the whole you use a pie chart, to show relationships similarities or different pieces of information it is a good idea to use a bar or a line chart.

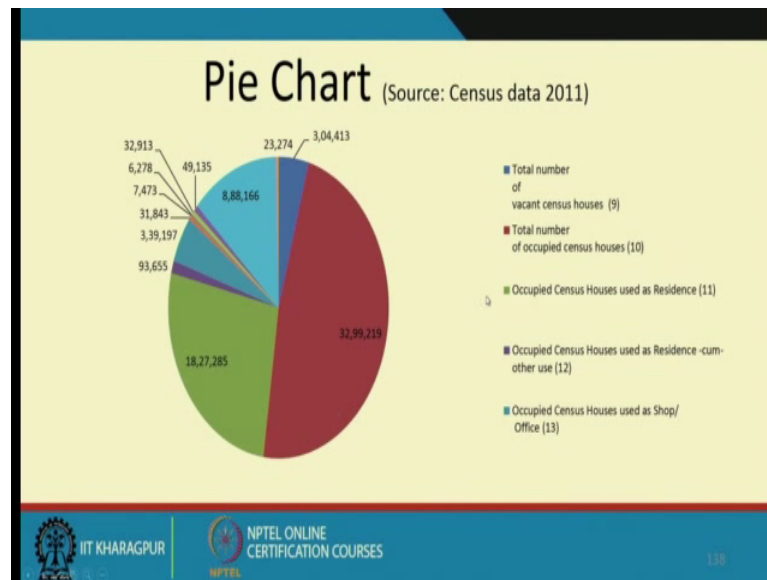
To depict the progress or status of information or events over time it is a good idea to use a line chart. To rank the importance or size of an idea event or object it is a good idea to use a bar chart. To present specific numeric information or brief comparative text it is a good idea to use a table. And to chart the duration of schedule activities for a project or task a gantt chart would be most useful. I will show you some examples of these. I will not show you the example of a table I will left this page blank you know what tables look like.

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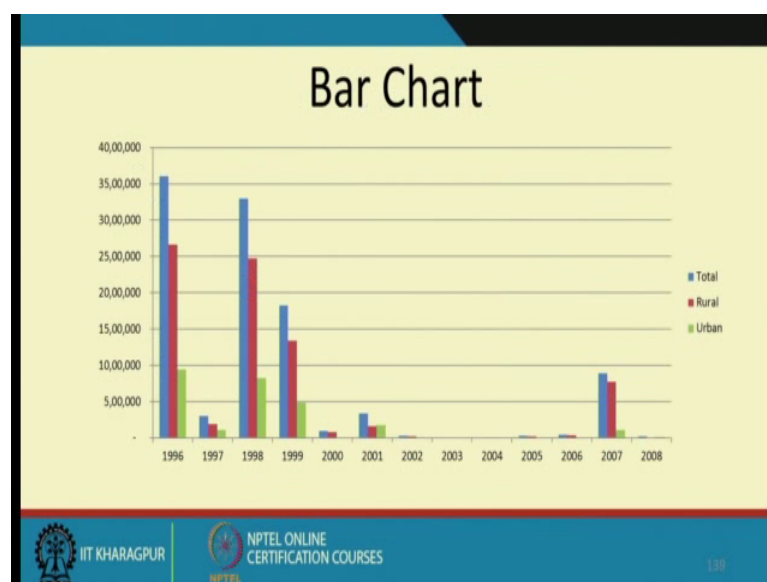
This is what a line chart looks like. Now this is a different ah different set of information, but I let us assume this is the number of people owning cows. For example, or cattle not even cows, this is the number of people owning cattle per year. So, let us go by that number this is not the real information or the number of people wanting to own cattle. Um or wanting to have let us just take a very simple thing; number of people owning cattle or number of number of people owning dogs for example, having dogs as pets. So, let us take a non-controversial topic here. So, we see that how those trend has changed over time. The total number of people owning dogs in 1996 or people who had dogs as pets in 1996 was close to 10000. 1997 drop to 098 went up, then came down then sort of tapered of. I would like this number to grow being a dog lover myself; however, we are just taking this as a random example. So, the total number is here the a in urban areas the number has dwindle, thantotal and rural areas the number is dwindling and the total number is also going like this over time this is just an example this is not accurate numbers excuse me.

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I made a pie chart out of some housing information, data through the senses data reports. So, you know. So, this is what a pie chart looks like; it shows the proportion relative proportion of different constituent elements to the whole.

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Now, again you know this could be the number of people owning, say or number of number of people ah having home cooked meals in different years. So, let us take that number may be in the year 1996 the total number so you can see the relative proportion over a period of time. And you can see how these values compared to each other. This is

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