

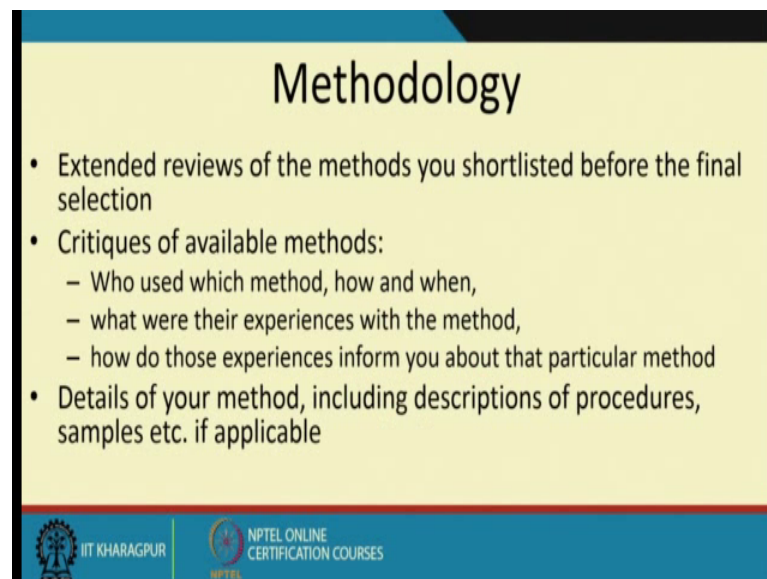
**Research Writing**  
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**Indian Institute of Technology, Kharagpur**

**Lecture – 16**  
**Methodology**

Welcome back to the MOOC course on research writing. I am Aradhna Malik, and I am helping you with this course. And we now, beginning with the third week of classes. And we are going to start with discussion on the section on methodology; what is methodology, how do you write it up, what are the things that you take care of while writing up this section.



So, let us see what we have for you here ok. What is methodology? Now, we often confuse between or we are often confused between using the word method and methodology. And methodology is nothing but an extended review of the methods you shortlisted before the final selection. Method is the way you do things. Method is the way you conduct your study, methodology is a study of the methods. And we often get confused between these 2 terms and we use the mental change ability. So, that is not what this is.

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**Methodology**

- Extended reviews of the methods you shortlisted before the final selection
- Critiques of available methods:
  - Who used which method, how and when,
  - what were their experiences with the method,
  - how do those experiences inform you about that particular method
- Details of your method, including descriptions of procedures, samples etc. if applicable

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We critique available methods and methodology what we do is, we try and once we narrowed down a research question, we try and find out how that question can be

answered using the available methods. So, we collect the most suitable methods, and then we review the most suitable methods, that we think are suitable for answering the question that we have at hand. And then we critique them. Critique, there is a difference between critique and criticism. Critique means, 2 compare and contrast or to find out the positives, and the negatives of between the different methods of the different methods available to us. So, we find out what is what in the available method suits are interest, and what in the available method does not suit, the it or does not help us answer the question that we have set out to answer.

So, how do we critique them? You try to find out who used the specific method, and how and when, under what circumstances was the specific method used. What were their experiences with that method? What was the experiences of the people who used the method with that method, whether they found it useful, whether then ran into some trouble, whether it took longer or shorter than what they had expected, what kinds of conditions was the method applicable in etc, how do those experiences inform you about that particular method?

Now, we all have are unique circumstances, we all work in different settings. For example, if somebody were to study the impact of the physical environment on mood swings of different people. So, let us talk about the impact of the temperature. The outside temperature on say the moods or emotional expressions of people in the work place. Now, if we go through a study that talks about or that that has evaluated people say, in Himachal Pradesh. I am talking specifically about India. So, may be in Shimla, a study was conducted in Shimla you know, within and and the this sample that was selected was students in Himachal Pradesh university.

Now, Shimla; in Shimla temperatures rarely go above 30 degree Celsius. So, for most part of the time the temperature, the outside temperature is less than 30, plus the humidity is not there in the ah; it is it is sultry it is humid only in the monsoon months and may be sometimes in the winter months when it is snowing outside.

So now, when we take that study try and apply the findings of that study to say a study, that is going to be conducted in Bhubaneswar for example. or maybe even Puri, which is Orissa. Puri is a coastal town. And so, we take that study and we say ok. We are talking about how the outside temperature effects the emotional expression of students in say,

university or in an institute of higher education. And we take that finding, and then we applied to students in a totally different setting. Here, in Puri the temperatures rarely go below 30 degree Celsius ok. So, it is not very cold. For the most part of the year the the temperatures are very high. And so, that can have a very different kind of influence on the type of results, that we are talking about.

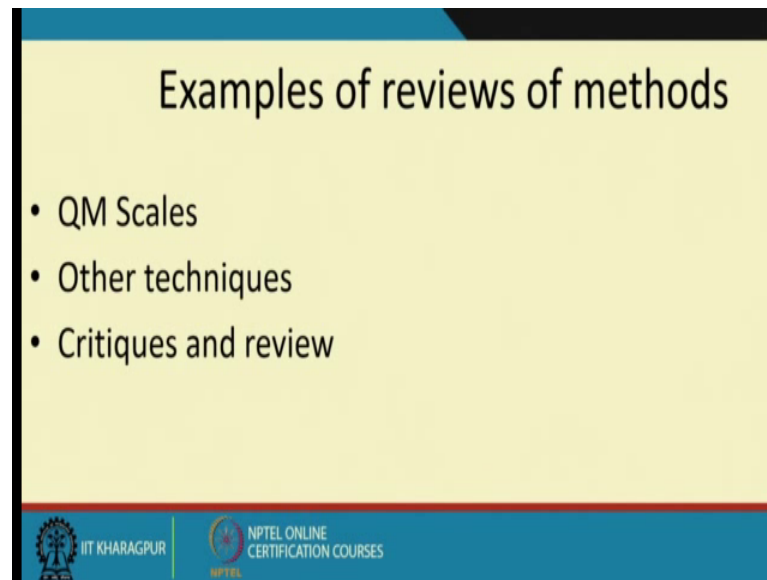
So, we find out how these experiences. It does, may be that study tells us, I am just taking a hypo thought hypothetical study. May be the outcome of a of such a study is that, yes, the outside temperature has an impact on the emotional expression of students in institutes of higher education. And these students going to Himachal Pradesh university are affected by the the temperatures when the temperature goes up or down or when, it snows or the sun comes out after snow.

So, all of that has an impact. But when we take the same findings and we transport them and we try and use the study. It is informing us. But the setting is totally different. The context is totally different. For the most of parts students are sweating instead of shivering. You know, so, the context is different it is informing us in the sense that the temperature does effect the these students. But to what degree and in what settings that has to be defined.

So, that is what we must write down. And we say ok, this study was conducted in Himachal Pradesh, which is a cold place, and I am conducting a study in Orissa, Bhubaneswar and Puri to be very specific and that is a warm and humid place. So, the outcome is likely to be different. The impact will be there, but to what extent, and what kinds of emotions are affected are likely to be different. And together these 2 studies may inform the knowledge base about something totally different. So, that may add value together to the knowledge base.

Details of your method including description of procedures samples if applicable. So, all of that has to be included in the methodology section, you study various methods you try and list to the contexts, in which that particular method was used what was the experiences? How does it inform you about the study? How is it different from what you are expecting to study? Then you also include the details of your method including the procedures, that were used the samples, that were collected and selected for the study and the samples, that were put through this particular or put through different methods.

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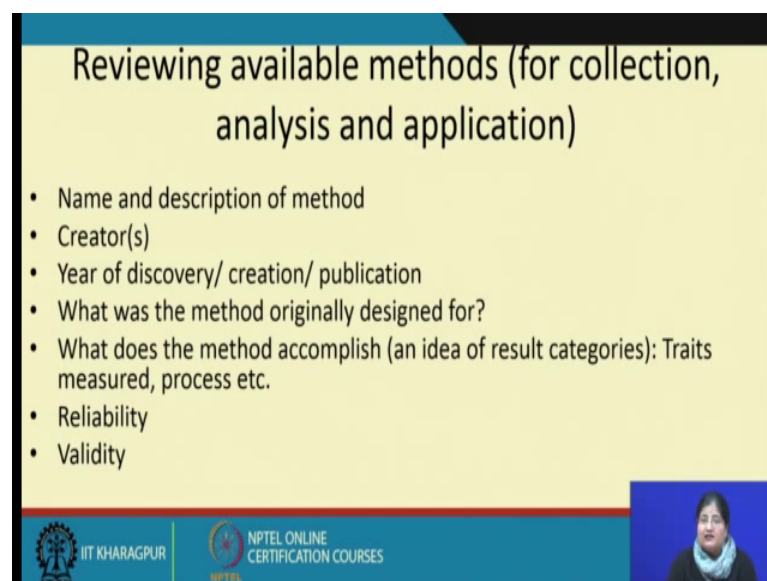
## Examples of reviews of methods

- QM Scales
- Other techniques
- Critiques and review

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Now, some examples of reviews of methods, some methods, some places where we can find reviews of methods, one is the quantitative method scales you know we have these scales, that are used to study human behaviour, we could also have other techniques, and we would also have critiques and review. So, different people, who have used different methods we find out what they have done? What their experiences were? What was their limitations they ran into? And then, we take those reviews and we study them, and we mention them in the methodology section ok.

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## Reviewing available methods (for collection, analysis and application)

- Name and description of method
- Creator(s)
- Year of discovery/ creation/ publication
- What was the method originally designed for?
- What does the method accomplish (an idea of result categories): Traits measured, process etc.
- Reliability
- Validity

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How do you review available methods for collection analysis and application? You write down the name and description of each method, various parameters on which, the reviews can be or on which, methods can be reviewed are one is of course, you write down the name and description of the method then, you talk about who created that method? Who put that method in place? Who generated that method? Who came up with that method? The year of discovery or creation or publication of that method.

So, when we these we are only looking at published material, we are not looking at something that somebody said, may be that will work in say action research, but it is always a good idea to look at published material. So, even in the publication people will say ok, this method was finally, published in say the year 1964, but the method has been a news since, 1958 fair enough you mention that ok.

So, you write down the year of discovery, or creation, or publication of that method, for say methods in the study of medicine I mean, medicine the whole field of medicine is built on case studies it is not quantitative research it is purely qualitative to large extend it is qualitative because, know to human bodies function alike so, many methods have been in use for may be 1000 of years for example, let us take the example of bringing down the fever of a person of a human being now, using a cold compress, which is cloth soaked in cold water on the forehead of a person or on the hands of a person to bring down fever is a method, that dates back centuries.

I do not think anyone knows, when this method came into existence this was purely out of commonsense or you know just a hidden try thing, that people discovered that, if you put a cold compress on a person on a febrile persons, forehead, or hands, or feat the fever does come down. So, if you want to write about that method, you may not be able to trace it back. So, at that point of time it may be a good idea to write down, when this method was actually started, or when when it was published and you know how people justified the use of this method? So, that would help then, what was the method originally designed for?

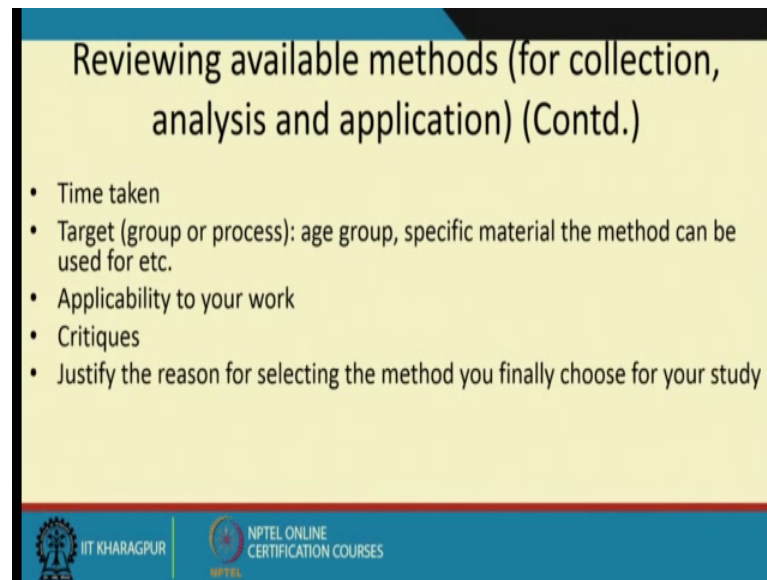
Many times, we use methods that were originally designed for one thing, but are in use for something different. So, what was the method originally designed for? What does the method accomplish? An idea of the result categories traits measured processes etc ok, what is the method originally used to accomplish? So, may be you know you could write

down, why the method was came into place? In what context was it published? How was it used? And what was it originally designed to measure? the reliability now, reliability in validity I will deal with together, reliability is the number of times a method produces the same result, that is reliability. So, and reliability is quantified especially, in the social sciences reliability can be quantified, reliability is the number of times the use of the same method in the same context yields similar results.

Validity is how well is specific method answers the question, that you have set out to ask, validity tells you about the fit between the answer of a question and the the the question itself. So, you know. So, so we and validity is also quantified. So, it is always a good idea especially in the social sciences, when you writing down these methods, or when you are trying to review methods it is always a good idea to write down the reliability, and the validity specially, if it is been quantified.

Then the time taken to administer a particular method, that really is an important factor while determining, whether a particular method can be used many times you know it is say for example, you using questionnaires now, a questionnaire that takes a 2 hours or 3 hours to respond to can be used, if you have that kind of a captive audience, these days people do not have that kind of times. So, if you are looking at a sample, that does not have that kind of time using a questionnaire, that that takes may be 2 or 3 hours may not be such a good idea unless, you cannot find another method, that serves your purpose just as well ok.

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Reviewing available methods (for collection, analysis and application) (Contd.)

- Time taken
- Target (group or process): age group, specific material the method can be used for etc.
- Applicability to your work
- Critiques
- Justify the reason for selecting the method you finally choose for your study

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So, the time taken to administer particular method would be helpful, another example could be in the pure sciences or in the engineering sciences. If you are trying to use a method, that takes may be you know that requires an uninterrupted power supply for may be 24 to 48 hours and you are in a place where, there are frequent power cuts unless you have a power backup, that can sustain for that long it may not be such a good idea to choose a method, that requires an uninterrupted power supply for say 24 to 48 hours because, you know you will have to rerun the program or the process again and again and again, if there is a power cut.

The target we are talking about specifically, for the social sciences the age group specific material the method can be used for etc. The applicability to your work you know, how does this specific method help you answer the question you have set out to answer, and how does this specific method then, lay down the foundation for future work. So, that is again a very, very important factor in determining whether, you should be using the specific method or not. Critiques of different methods. Now, in some methods you will see that, a lot of people have used a particular method and they have not found the the method to be useful it is like, going through the reviews on a popular e commerce website, we go through these reviews before selecting what to buy?

I know many of you would be online shoppers, just like I am you know if you are living by yourself and if you have or if you want to buy a thinks, that are not available in within

your vicinity you would probably be an online shopper and you would look at, how people review a particular item? Knowing fully well that these ecommerce websites, heir people to write these reviews for them; however, you would still go through the reviews like, I do when you are trying to buy something similarly, while selecting a method these critiques help knowing, how people who have used that method have or have experienced, that method is very helpful in deciding excuse me, whether, you want to use that method or not.

And then, on the basis of all of these parameters and some more, that you might find useful for your specific study may be the availability of the sample could be one criterion, you may want to use a particular method, but this specific sample on, which the method can be used is not easily available or it is expensive, may be the price could be one more parameter, at times there are methods that are available, but they are just not within your research budget.

So, all of these things are different factors, that help you determine the choice of method, and when you write up the methodology section, put in all of these in clear cut in detail helps you justify your choice of method, that you finally, choose for your study and let me show you a tool, that I use for a for this purpose for my studies.

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Methodology				
• Study of methods to select the method most appropriate for answering the question you asked				
Methods	Parameters			
	Time taken for administratio n	Cost involved	Year of development	Reliability

This is what I like to do. Now, this is called an info graphic this is a table, what you do is, you list you select different methods based on the reviews that you have, and when you



when you conduct a thorough study of the methods available to you, you will find that, at the end of that study you will come across or you will be able to shortlist about 8 or 10 or 12 different methods, that seem most appropriate to answer the question you have asked, you can not use all those a 10, 12 method. So, what you do? You then, put them out in the form of a table and over here, in the parameters section, you write down here, let me show you how I like to do it? And that is why I kept it empty ok.

So, in the parameter section you write down say may be the time taken for cost, may be the year, in which the method was developed could also have a bearing on your choice of the method in the social sciences specifically things change with time. So, may be the year, in which this particular method was developed and along and has been used, may be the last critique you found for a particular method, that was developed in the year 1960 was form the year 1985.

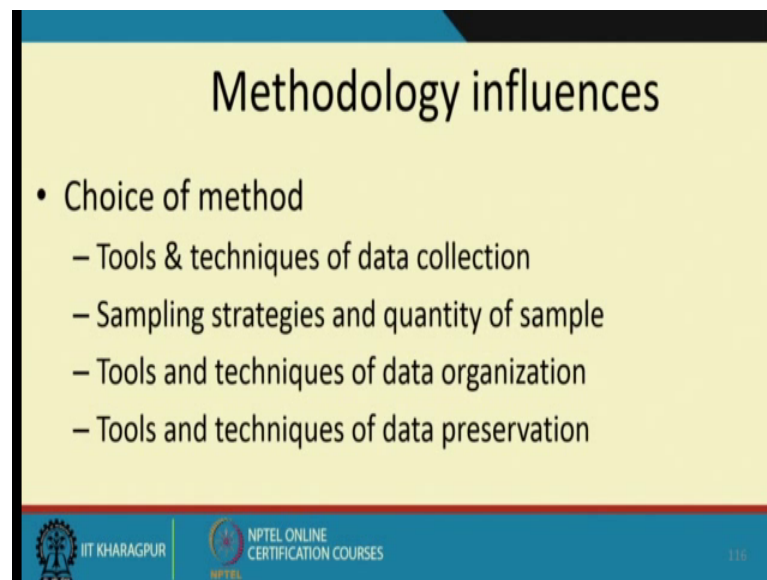
Now, in India there has been an information boomed, there has been the the internet has invaded our lives, and the internet invaded India sometime in the mid-1990s. And so, anything that came after 1985 would have had a strong impact or would have been influenced by the advent of the internet, and now we are at the stage where everybody carries 1 or 2 cell phones, your local vendor, your local rickshawala, who may not have a permanent home to stay because, he is he has migrated from a different state, to be in your state and to to work in your state, he would not have a permanent place to stay, but he would probably be carrying 2 cell phones 1 to stay in touch with his home, and the other to stay in touch with his customers.

So, you know the internet has invaded our life. So, the year of development and use of a particular method, would have an impact in this situation if there was a method, that was developed say to be used a before the internet invaded our lives, I am talking specifically about the social sciences ah, that may not be very applicable here, the year of development could be one criterion again, you would have different criteria depending on what you are doing ok, and then, you could have reliability, and you could add as many columns.

And you could have another column, in which you could put validity and you could put all of these parameters here in this table, you make a table and everything becomes clear and then, you explain each cell of the table whenever, we write tables it is always a good

idea to provide a very crisp, clear cut, description or statements a set of statements about what the table includes, and then this then, helps you convince the person reading your document about what you are doing, and about your choice of method. So, you know and you could just keep adding to this depending on your own specific question.

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The slide is titled "Methodology influences" in a large, bold, black font. Below the title is a bulleted list with a black circular bullet point for the main heading and four hyphenated sub-points. The background of the slide is a light yellow color. At the bottom of the slide, there is a blue footer bar containing the IIT Kharagpur logo on the left, the NPTEL Online Certification Courses logo in the center, and the number "116" on the right.

- Choice of method
  - Tools & techniques of data collection
  - Sampling strategies and quantity of sample
  - Tools and techniques of data organization
  - Tools and techniques of data preservation

Now, what does methodology influence, methodology influences your choice of method, when you study your methodology is specifically aimed at helping you narrow down, or helping you arrive at a decision regarding the method you would like to use for your study. So, your choice of method is critical here, and within that method the tools and techniques of data collection, how will you collect? What method you will use will in turn determine?

What kinds of tools and techniques you will use for data collection? The sampling strategies and the quantity and quality of sample quantum of sample, how many people are you going to interview? How many traits are you going to measure? Etc, tools and techniques of data organization depending on the kind of data you collect, and the volume of data you collect, your data organization will be influenced by how well or how thoroughly, you conduct your methodology.

So, this class you will say were, but this class is only about research writing, when we write about research the way you presented will help you justify each of these things, if you put everything out in the form of a table, and you say this is the the the method I am

using but even within this method, I am going to use only this part of the method and not the other part, tools and techniques of data preservation now, data needs to be preserved for future use, for future reference, to justify that you have done your work well. So, all of this will be influenced by your choice of method, which in turn will depend upon your methodology section, and how well and how crisply you presented.

So, my advice to you is when you are writing up your methodology, please initially in the first draft be as verbose as detailed as you would like to be, that will really help you then, cut down and make it as crisp as possible, I have said this time and again and I say this to my students also you need to be prepared for 40 to 50 drafts of any document, that you write before you send it finally, for approval or publication it is not possible to write a good document, without that many revision it is just not possible even for those of us who have a very good grasp overall language, overall concept, unless our draft goes through, at least 40 to 50 revisions, it is not it may be accepted in less credible publications.

But in order to produce a top notch a top class document your document must go through 40 to 50 revision, and that is why do not be scared, write down everything and then slowly, slowly, slowly cut it, and tailor it, and make it as crisp as possible to fit in to this table now, many times these tables can run into several pages, that is all right, that is absolutely all right because, this kind of a table this is one way of doing it, you could come up with another way this is the way I like to do it.

But you could come up with another way the idea is to evaluate the methods on the basis of several parameters, and come up with a solid robust justification of the method you would like to use. So, if you can come up with the better method, please share it on the blog and we will all benefit from your ideas. So, I would really encourage you to do that ok, and that is all we have time for in this lecture, we will continue with some more discussion on research writing in the next class.

Thank you very much for listening.