

## Chapter V

### Project and Report Writing

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**Abstract:** This chapter explores essential aspects of project and research report writing, offering guidelines for effectively communicating findings. It emphasizes the importance of clarity, conciseness, and logical flow in report writing, integrating Aristotle's principles of communication—logos, ethos, pathos, telos, and kairos. The chapter outlines the critical stages in project writing: defining the research problem, selecting the appropriate methodology, and presenting a well-structured report. Key steps include conducting a literature review, framing research objectives, and using a clear methodology for either primary or secondary data collection. The chapter also discusses the importance of selecting appropriate graphs and tables for presenting results and highlights the need for a focused conclusion that summarizes findings, limitations, and future directions.

**Keywords:** Project Report Writing, Research Methodology, Literature Review, Data Presentation, Research Communication

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I would be discussing the things that we need to keep in mind while writing a project report, a research report or even in the long run, anyone of you is interested in converting it into a research paper. I'm going to talk about or discuss with you or give you certain tips of writing effective project reports or research papers. All of us at the stage of your career that you have to write project reports either as a part of your curriculum or you would be undertaking research projects as interns. So, it becomes very important for us to understand how we communicate our findings to the outside world. So, what is a project report? It's a medium of communication by virtue of which you put forth your academic findings towards a larger audience. That larger audience could be a peer group if it is a class project, it could be the company where you are doing an internship or employed with, or it could be any government agency for which that product project may have been undertaken. So that communication, as you all understand needs to be crystal clear, needs to be concise, needs to be understandable. These are few things that we need to keep in mind when we move ahead in this particular area. I would just want to begin by stating the Aristotle concepts; he was an ancient Greek philosopher who talked about effective communication functions. His theory of communication actually rested on the five functions that have been listed here. The first one called 'Logos': actually, means reasoning or logic which should be there in the report that you present, it's the text that should follow logically. Next is 'Ethos'. It probably has to deal with ethics involved in writing the project, so the credit credibility and the trust worthiness of the author. The third is the emotional appeal 'pathos', pathos should be making sense to be people for whom this research project is actually meant. 'Telos' actually means the purpose for which the project has been undertaken. And last of all is 'Kairos', which means that it should be relevant to the present times it should be relevant as far as the time the setting is concerned, it should not be something which has been debated. A long time ago and has lost relevance because of that project or that report if it is quoted will not make sense to a lot of people. So, these are the five functions and you will see how nicely it relates to our entire concept of writing a project in the current scenario. Now what is research? Any project that you undertake is actually your research, as the word suggests, research means you're trying to search again, means doing it over again. So, you trying to address the theory maybe you're trying to address the concepts that have already been in place,

or you trying to revisit them. That is what is research, so a project that you undertake involves some degree of research. Definitely, it makes you look for data, it makes you look for things which may not be very visible and try to present an analysis out of the things that you have seen. So, it basically is made up of these three steps: the first one obviously is the problem definition, which basically means what are you actually trying to achieve, what is the objective of the study. The second is the research approach, which basically means the methodology that you are going to adopt to find answers to your questions to your problem definition. The third is the research report. Which we are going to kind of discuss today. What do you mean by research report. The research report cannot be discussed in isolation of the first two. When we talk about a research report, we will have to talk about what is a problem definition, how do we write it, what is the methodology, how do we present it. So, everything is actually contained in the research report. The research report actually is the interface between the investigator, which means you in this case and the larger audience for which this project or the report is being written.

Now, we talk about the characteristics of an effective project report. Basically, just keep in mind that the research report that you are going to write the project report that you present should have a focus. By 'focus' I would mean it is in a position to communicate the information it is trying to communicate. There should be an objective which should be very, extremely clear in your mind. It should be accurate, which means it should not be misleading in any way. It should be clear, which would actually mean that it is not confusing. And last, it should be concise, which means that your project report cannot actually run into pages and pages. It has to present your findings in a very logical manner as we discussed earlier. If it is voluminous, which means if it is giving each and every minute detail of your findings, then probably the person for whom it is meant loses interest in reading through your project report. So, I would not advise project reports that run into pages and pages. In fact, when you translate your project into a research article by the end of the day because that is something that all of us should focus at, once we learn how to write project reports. The project reports still are bulkier as compared to the research article, which has to be more focused, has to be more concise, has to be clearer, but the detailing that is required maybe more in a project report as compared to a research article.

How do we get started? How do we go ahead writing a project report? So obviously your interest area. Before zero down to a topic, your research area, something which is extremely important, something that you feel very strongly about. It is probably the area that I would

advise that, you should work on or for which you are trying to find answers to. That stage that you people are at this moment may not be very clear what interests you. So, my advice would be to indulge in a lot of reading, because that is the only way where you can list down your areas of interests. and you can think in terms of writing articles, writing reports on that particular area of your interest. Now in this case, you have been given a research project which you are working on, that really simplifies a lot of your things at the moment. So, if you read, keep read a lot about the relevant stuff. I'll come to each and every characterization in detail, but keep records of whatever flow that has to be there in your mind, so you need to keep records. I'll also tell you how to keep records and which is the easiest way of keeping records, as I guide a lot of my students regarding this. Create a mind map. How will the mind map help you? it helps you frame of flow. A flow as to how you are going to approach the topic or a project that you are working on, what are the steps that you are going to actually undertake. And this also helps you find out the lacking the areas where there are missing stuffs, missing values which you can populate. As we teach in data science here. obviously, it is not happening that way. It is a missing information that you would want to want on.

So, once you've done this, then you think of writing it what is going to be the body, what is going to be the introduction, what is going to be the conclusion. So, most experts advise that the introduction to be written in the end, but I would differ and I tell you why as we get along. So, in a project report, very clear statement of purpose. What do I mean by that you have to write in two, three sentences the objective, be very clear about the objective that your study has carried out. Don't elaborate it at the moment a lot. Conduct a lot of research as we call as a literature survey. It could be a newspaper article, it could be a journal article, it could be reports of the government and the ministry. So, depending upon your area, a lot of studies have to be conducted on your topic of interest, which will help you gather a lot of information that is required, which can be analyzed at the end of the date. So, in case of data is required, you may go ahead and collect data, you have to decide whether you're going to undertake primary or secondary data research. So, all that has to be decided before you actually translate everything into writing or write it down in the form of the research report. So, what should be the contents of your research or project report. There's always a title page. This is going to be followed by the abstract. Usually, under the abstract, we have keywords also given these days, if you're writing for a journal or a research article. Then there is a table of contents in your project report precisely.

There is an introduction, the introductory section there's a literature review, and there is methodology in case you've conducted any experiments. These do not mean only scientific experiments where you have a lab setup, these experiments could be you know conducted on the focus groups as well where you are working on because you told me about literacy, there was somebody who was working on the cultural landscape so you can actually go meet people converted into a focus group interviews kind of a thing so that becomes your experimental setup. Then you have your results, your discussion, and conclusions which are followed by references and bibliography and an appendix. What I would advise students to do is to begin with the literature survey. The writing styles basically wherein you need to be careful about using a passive voice instead of an active voice. So, there are certain examples, when you review the literature, you don't write it as we reviewed the literature, the authors or all the literature was reviewed maybe. When you talk about the survey conducted in a controlled setting, it was said in a passive voice again, these are a few things that you need to keep in mind, but what I would want to discuss in detail that I would always in this flow of writing a project report, I will always advise you to start with the literature review. How do you do a literature review?

Once you've decided on your area of interest, the topic that has been given to you, you try to search the relevant articles, relevant reports of the ministries, maybe of the state government if you are working in a different state, only relevant topic. So, if it is a water crisis that is being worked upon, you might want to find out the reports of the government of that state on it, if it is on literacy you might want to find out the state of the literacy in that area and the initiatives that have been taken by the government this direction or to ensure there is no gender discrimination, as far as literacy goes, so on and so forth. So that is the first step that you should always undertake. Start with the literature review. Second point that is very important is don't just sit on the net and google search that topic. It is always better, to do it on google scholar rather than a normal google search. Why I am advising this? Because in google scholar, you tend to get scholarly articles which are more creditworthy if you remember in the beginning we were talking about the creditworthiness and the trustworthiness that you have to establish. So the idea is that probably you going to get more authentic work in google scholar if you are looking for research articles on the topic that has been suggested. My third advice to you as far as a literature survey or review goes is when you read an article or report, try to at the same time one read it in details. Try to make sense of what it is trying to say and the third thing that you should do is to record it. Record it probably in the form of a table, all literature that you

survey all articles on the relevant topic that you read should be summarise in the form of an excel maybe an excel sheet or a table that you make in word, whatever you are comfortable with. The table should have columns like the name of the paper, maybe the second column has the author's name, the journal in which it was published, what is the report, the year in which it was published, whether it is a central government report or a state government report and the third (column) you may probably write the objective of that report that you have read or the articles that you have read. the fourth column could contain the methodology used because this is what is going to help you frame your methodology.

The next could be, if it is empirical research, if data has been collected, if variables have been identified, what variables were identified, what were these sources, whether it was a primary or secondary research that was carried down, so that should be the next column and the last could be results. So how will this help you at the end of the day it summarizes all the articles that you've read, all the surveys that you have undertaken, all the literature that you have read, it will help you write this section very effectively. Next, it will help you frame your methodology. I will advise you after having done this and it could be one or two of these reports which actually form the basis of your study; it will set the direction in which you would want your project report to go. You might take subheadings from a number of these sources and try to incorporate in your report. So that is how it is going to help you.

So after having studied this, I would advise you to go to the introduction section, there are certain authors who would not advise introduction to be written second. As I told you, if they advise the introduction maybe to be written at the end that is also perfectly okay. But why I insist you writing, obviously this introduction section would be revisited again once the conclusions are in place, why I am telling you to address this section next is because you've read the literature now, you know what are the gaps in the findings of certain authors who have worked in this area on which you want to work upon, and how do you get hold of those ideas is because at the end of each article, each report that you read, there is a conclusion section, and in the conclusion section there is you know a future course of action proposed. Now that future course of action really gives you an idea what are the other related things that can be worked upon. Obviously, you're not going to replicate the project or the report that has been written by somebody else, it has to be a novel idea that you have to come across with you have to think logically and creatively to achieve your objectives. But what will form the basis of this ideas is the survey of the literature that you conduct. So, what do you do in the introduction section? Start by setting the background, the current state of affairs on the problem that you are

investigating. I'll give you an example here, suppose I want to work upon a very relevant topic of Covid-19 and its impact maybe, now it's a very broad topic I cannot work on everything and anything related to Covid-19. I need to understand what my objective of the project is. I'll come to the literacy project as well. I give your ideas on that as well. So, what I'm trying to tell you here is that suppose I decide that this is a very relevant topic, maybe this is something that I would want to gain more information about, write something about it. So, there are various things that you can do. One you might want to present a historical perspective of the pandemic that has affected the global community until date, wherein probably Covid nineteen would be a comparison with the earlier pandemic where you are going to collect secondary data on what were the pandemics, what was the year in which they were prevalent, what was the nature of the crisis, what was the impact and probably try to compare it. So that is a purely exploratory on a descriptive kind of research that you undertake where secondary data, which is already published helps as a guide. So, research objectives or questions are addressed that we are written that way. I might be a person of mathematics or statistics who would want to predict the future of the covid nineteen in a country like India or maybe in the U.K., the U.S. I use mathematical models then, so that research becomes an empirical research, empirical project that I might want to do on behalf of somebody. So, for that maybe I, there are mathematical models available, something like CR models that we come across where that model is based on differential equations. So that is what you need to decide while you write your introduction. The way you are going to approach it is going to be entirely different.

The third aspect could be the impact of covid-19 on the psychological state of individuals, who suffered or the families who suffered from this, that becomes a very different point and this you will not find it in literature. You'll find literature on it where studies have conducted, but you will have to conduct your own study so you will have to decide to go in for a secondary kind of research for that. In the onset, when we started, we talked about literacy as a project, maybe that is being undertaken by a student. When we are talking about that, it could both be a combination of exploratory as well as some data collection or empirical research could have been done on that topic, which will give policy suggestions. So, until and unless you go to that area to that grassroots level to actually see the state of affairs, i.e. the primary schools available-how have they performed in this crisis. So that becomes a different perspective whether they have digital access, whether they have digital infrastructure to attend classes that become a matter of concern. That becomes an entirely different approach which will obviously become a combination of exploratory as well as descriptive kind of a research. So, in the introduction

you have to set the background, the state of affairs if it is a state that you are working in, what is the state, what is the level of literacy, what is the percentage of children who go to under fourteen who attend schools, maybe what is a state of higher education and stuff like that. So that becomes the setting, the background, which will give you your ideas next in the introduction. Now you need to set your research objectives, the objective of your study. These may be two or three questions that you wish to find answers to. This methodology would also talk about the methods that you propose to achieve those objectives of yours.

Obviously, when conclusions come in you might want to change it slightly. But the background and why this research was undertaken, why was this project undertaken in the current scenario is something that you should write after having conducted the literature review because it gives you the lacuna the literature that is present actually helps you frame your research, objective and research questions. The next thing that we go on to is methodology. The methods section, what is methodology, how did you go about conducting the research on the project that was assigned to you? Did you conduct primary research that I talked about earlier? Did you go in for secondary research if it was primary research? Did you conduct the research yourself right as an investigator or these was a question here that was designed by you. So that becomes entirely new area where there are certain things that need to be kept in mind while designing that questionnaire, the audience is very important for whom this questionnaire was addressed. So, if you're trying to find out the literacy or the perception of students in Uttarakhand village regarding online teaching, so obviously the questions that are going to be framed are going to deal about different aspects of that perception. What do I mean by different aspects of that perception is whether they found these lessons difficult to understand which subjects they found difficult to understand. Answers to questions like, do they have the access to the necessary digital infrastructure to attend classes. Is the bandwidth or the connectivity in place fine. So that your questionnaire has to be designed keeping in mind the audience for whom it is meant. You might not go in for primary research, you might want to go in for secondary research, all the reports that are in place of the government on literacy may be referred by you. In methodology, you have to quote the resources that you've used, the sources from which the data was collected, how was it collected and, which publications did you consult. Now when I talk about the resources you have to be very careful why you conduct secondary research, on the resources that you consult. If there is numerical data that is required, maybe on the state's literacy rate. So, if it is only on India, then you have to locate authentic Indian resources. By authentic Indian resources, I mean the publications of the government of India, the publications

that are very common and commonly used by researchers include the R.B.I handbook of statistics on the Indian economy. It could be the national account statistics, if it is on education then the national sample survey organization comes out with the education report which contains a lot of demographics and statistics about the state of education in country state-wise, district-wise, everything and anything that you require is all available. But the source will have to be authentic. If you want to work on a cross-country analysis kind of a thing, where you just don't need data on India but data on other countries of the world, then the resources that become very relevant for us are the World Bank. World Bank comes out with the world development indicators. These indicators are not just ignoring indicators, you have all socio-political indicators, even the extent everything like internet, penetration, things like the percentage of population under, fourteen years that is educated, the digital divide, the gender bias in education in countries, everything which I'm trying to tell you that, and it is a comparable resource. If you are thinking in terms of comparing India with other countries, there is also a resource of the international financial statistics by the IMF.

If you wanted to work on larger data sets, for example, we talked about Covid predictions a little while ago, and then you have. and you may have come across the "world- o-meter" database or there is a database available on the Sheirden, which is the John Hopkins University database. These are all authentic databases which are in place. So, if you decide to do a secondary research or collect data or utilize or analyse the data which is already being collected by somebody, then the resources have to be authentic. There are certain authentic places that you should go to. All ministry reports are definitely authentic, so the state government reports have to be consulted in that respect. So, methodology when you write so it's actually the process you undertook to conduct your project, how the data was collected, what was the sample. If it was only exploratory research which means only descriptive research then you may have consulted a few authors, you may have consulted a few reports all that needs to be quoted and written here in the methodologist section. If it is empirical research, definitely the methodology section becomes a larger. But if it is a descriptive or exploratory research, it may not be that large. Now I go to the result section. Result section here is actually your analysis.

After having done the literature survey, written the methodology and the introduction, then you have to write down your analysis right of the reports that you conducted. Which means adding a new dimension or a perspective to these studies that are already in place. How is the result section written? Usually, it includes text, it might include graphs, it may include tables. These are the three things that you include in the results section. Now when we talk about what

do you choose? Obviously, I would suggest it should be all three should be put in place if it is only text, especially if you worked on or collected data or summarized certain findings of other people with which you trying to analyse a table which may be non-numerical in nature, may always give a jest of your findings and your analysis. If there is some data that has been collected by you over the years, then it would be depicted through graphs or tables. Normally, when do we choose tables when there is a lot of data that needs to be communicated. If I'm trying to show a relationship between only two variables, then I will go in for a graph because a two-dimensional graph is a be able to say everything. One thing that you should be careful here is that don't include a graph, a table and also write it in text, don't duplicate. The table or the graph should be self-explanatory. For example, if you're trying to show in your report the trends or the literacy rates over the years right from independence till 2022 or what is the male-female literacy rates of Uttrakhand 1950s to 2022. So that could be very easily shown with the help of a trend line, a graph, a line graph which shows the movements up and down and it's self-explanatory. You don't really need to write everything that the table is saying in your text as well. You can give the basic idea about what the graph is communicating, but you may not give or replicate it. That's what I'm trying to tell you. So, there are certain decisions that will have to be taken by you. But please remember when you write the results section, the flow has to be there, which means that each question that you wrote down in the introduction, each research question that you wrote down in the beginning has to be addressed and there has to be a natural flow of one thing leading to another. Somewhere you are writing literacy rates then you go to gender and then you discuss the focus group's interviews that you may have taken in that village of Uttrakhand regarding their perception about online. It doesn't have to be haphazard. It has to be logical with certain subheadings. First, probably you may talk about the state of affairs in that state there with graphs. Then probably in the end can come the findings of your research into your into that area and so on. This is just an idea of including numerical tables in your research reports. There are certain tables which go into the appendix and there are certain tables which should form a part of the body of your report. You have to take that decision, if it is a huge table which has a lot of data. Then it normally does not form a part of the body of your report, it goes as a reference table. Certain snippets from that reference table may appear in the body of the text, or the key highlights might appear in the body of your report and if it is just a fraction of the total data that you may have collected then it may not be very precise. (41:43)

Next comes the result section, which was the analysis part. So, we need to decide upon what graphs we are going to use and I have tried to you know for your benefit, try to include certain graphs here. My idea here is just to make you understand that each graph is different. You have to be very careful in choosing the type of graph that you put in your project report. The next is pie charts, which communicate a lot of information but they cannot be used everywhere. They can only be used when you try to bifurcate the percentage, which should always be one hundred percent. Try to choose the right graph to depict the information that you intend to depict. There may be bar graphs, it talks about a lot of information. much more than that line graph was given giving. But that line graph showing trend over time. So, the data that needs to be communicated and then choose the graph. Then comes to discussion or conclusion, which summarizes your results. It should not be very long the key findings of your study and how do you do it, all the research questions that you had written in the beginning, all the objectives of your study are being addressed in the conclusion. You should be satisfied that you have been able to make a good or do a good job of the task that was interest interested upon. Here also, you write down the limitations of your study. For example, you were not able to visit a lot of households or the people with were not forthcoming to answer to a lot of your queries, if you go to a and conduct primary research or there was some difficulty in understanding the questionnaire, probably that you designed. So, it was very difficult to communicate and you failed maybe while conducting or while administering the questionnaire that people were not forthcoming with the the right kind of replies. So, this could be limitations. The sample probably you chose because the time limit that you have to conduct your project was very less, that the porosity of time really did not help you get good results. These are things that you write. So, your conclusion has key findings, has limitations and also has the future plan of action that from here what can be further explored after having done this. It is this section that you read in literature survey of other peoples that gives your ideas. So similarly, what you write here will be useful for your own working in this area or might be useful, you know for somebody else who's wanting to work on the same. Don't forget to mention the source everywhere if there are somebody's findings that you are trying to quote. Please put it in inverted commas and quote the person whose findings are being used by you. This becomes very, very important because tomorrow if you get these things published, then obviously, it should be a reflection that the project is your own book, it has added something novel to the existing work that has been done here. That novelty can be included when you write the introduction section how is your study going to be different from other. The place that you have chosen is different to conduct. So, the setting is different, the time frame maybe different, there may be studies in India on literacy that may have been

conducted in 2010, not in 2015, not in 2020 after the Covid. So that could be the novelty, but you may be using some of the research techniques or methodologies that are already in place.

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