Introduction to Research

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Lecture - 02
Role of advisor and Role of student

Prof. Prathap Haridoss: So, maybe we can have some more discussion on what we feel is are now specific aspects that a student should consider as role of a student in the PhD process, and may be what he or she can expect from a guide, and therefore, what would be a reasonable expectation as a role of a guide. So, these are some things that maybe looked at.

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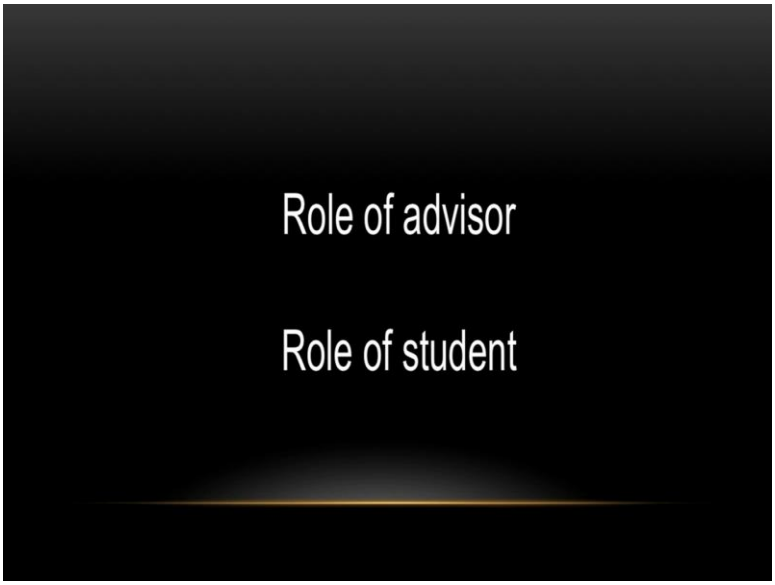

Prof. G. Phanikumar: So, I will prompt a question and then see. So, do you expect an advisor to give a day-to-day guidance on what to do? Do you expect the student to turn up and say, Sir, I have done this today and what should I do next? Is that how it works?

Prof. Arun K. Tangirala: It is not a mission mode thing, where you have set of instructions.

Prof. Andrew Thangaraj: Yes.

Prof. Arun K. Tangirala: And then, you keep executing those instructions by the day, there is a calendar of instructions, there is nothing like that. Remember, the term that we are using is advisor or a guide, which means, that you keep exploring and when you think you are getting lost or when the advisor sees that you are getting lost, the advisor changes the direction of your research slightly, and it is like you are travelling in an unknown sea, you are steering the boat, but the advisor is just watching where you are steering. And also, the role of the advisor is to help you interpret the results, put the results in the right perspective and so on. So, I think that is a very important point which is probably missed out by many students. They expect the guides to actually give out day-to-day instructions or, you know, or weekly instructions, I have done this, now what next? That is not at all research. Research is all about trying to find out by yourself, but with the support of an advisor who will make sure that you are not lost in the unknown territories forever.

Prof. Andrew Thangaraj: So, I mean going back to my own experiences and maybe similar experiences, if you look at the more like mundane aspects. So, typically once you fix, once you are fixed under an advisor and you start working, you go to the advisor and start talking about what work is may be interesting to you? What is happening currently in the area? So, the advisor probably may tell you, may be this area is very interesting, you go look at papers. There are some advisors, who would go to the extent of giving you a list of 10 papers, you read these 10 papers and read this 11th paper, and then try to reproduce; they would do that. Some advisors, would say, you know, go read, this is a new area, exciting area. And now, again, it is again a style issue and a compatibility issue of which student kind of likes this first kind of advisor, who just says this area you try it and then see what happens; and the other advisor, who gives you a series of papers and says, you reproduce the result in the 11th paper. You know, I think some students, in fact, do not like the second type also; they would like to explore more, so that roles change a lot, but once… but that is usually common. Your advisor starts you off. I think that is more or less common in 99 percent of the cases. And then, after that, the student plays a huge role in what happens.

Prof. Arun K. Tangirala: I think that it is a very important point.

Prof. Andrew Thangaraj: And it is completely up to the student, there are students who just go out and read, left right centre and everything they read, and then do a lot of work, and come back to the advisor, and say, I have got this; I have got this; I have got this; and there are students who will slack off, and then, you have to chase them, and it just changes from case to case.

Prof. G. Phanikumar: So, now we are coming close to the role of the students; I will just prompt some question. Abhijith, just tell me, is it necessary or important for a student to be super intelligent before they take up research or they should be getting into adventures before they can get into research? Should they have that kind of a mind set or should they be very, very hard working to be able to do research? What characteristics do you think, students should have so that their role can be fulfilled as a researcher?

Prof. Abhijit P. Deshpande: Yes, I think to begin with like what we said from the beginning is, you know, interest, spirit of learning; I mean those are really the basic traits that you start out with. You do not start out by saying that I will do the… as we said it may not be path breaking immediately and things. So, the initial part of things is this spark and excitement, and these are the words which actually describe our spirits initially. And going back to my experience during my Masters' degree, for example, I would go and discuss with the advisor, and while we are discussing the advisor will say, why don't we try this for fun? And, you know, that really excited me, and sometimes, the reverse would probably happen, that actually without my advisor telling me, I actually did data acquisition for my experimental setup; then advisor says, oh! this is very exciting. So, actually both of us have to really spur excitement in each other about that technical topic. So, that is a very important role that both actually compliment, proceed further.

Prof. G. Phanikumar: Passion.

Prof. Andrew Thangaraj: And also, there is a routine to it. I keep coming back to routine; I do not know why! You know, for instance, most advisors and students meet once a week right, that happens, and they meet regularly, I think that helps, it helps. I think it helps in the long run to meet regularly even if your advisor is not particular about meeting, it's good to force a meeting once in a while because there the exchange of ideas, just you voicing out the idea, just saying it out loud in front of an advisor helps a

lot in clearing things in your head. When regular meetings happen and what happens in those meetings who pushes where, like Abhijith says, it changes from time to time. Might be times when student is down and the advisor steps in, and says maybe you look at it this way. Maybe times when the advisor is not interested and student has to jump in. So, it changes over a period of time. Some advisors are very hands on, they work with you on the board, write down, derive, etcetera. Some advisors will say, I am not going to be hands on, you read the paper, it's your problem. It changes, there is no universal rule. There are benefits and negative points about both, but I would say regular meetings, yes; very important.

Prof. Arun K. Tangirala: If I can just make three points, which are probably consolidation of what Abhijith and Andrew have been saying. One, I think is the attitude, attitude - the student's attitude makes a big difference. When a student comes to me and says, well, I want to work, I want to really work towards a PhD under your guidance, I say that I don't expect you to have knowledge, going back to the question, I don't expect you to have the requisite knowledge at all because knowledge is typically acquired through course work and learning. What is most important is attitude. If you have the inclination to learn and carry out research, you are ready. And secondly, I think what Andrew was pointing out is some advisors would define the problem for you upfront, where as some advisors would like you to define the problem, and in that context, they will give you a few papers and so on. Some students enjoy the defining their own problems, some students don't; they want the problem to be predefined and that plays an important role in choosing your advisor. These days, students as he said, homework, do a lot of groundwork before, and then, you know, find out how depending on the reputation the advisor has and so on, and choose the advisor.

And, I think the third thing is sharing your results with the advisor makes a big difference. Some advisors are extremely busy and some students don't like that. Some students would like to see their advisors every week and share. And simple discussion Like Abhijith said, a simple discussion will even before the advisor gives you ideas, just a listening ear will actually give you ideas. So, I think there are several factors that go in to choosing a advisor and there are several factors to watch out for as a role - as what your role is - and yes, I think we probably outline this.

Prof. Abhijit P. Deshpande: And the basic, again going back to some of the routine, note

taking, noting down things, making systematic consolidation of what you have done, what you want to do, time management; there is lot of this that is actually very important because again it is a long-term process, and a student must keep on reminding about many of these things, and actually implementing some of these things, as the time goes on.

Prof. Andrew Thangaraj: Just to close out one final thing. So, initially you might think that the advisor has more knowledge or more awareness of the area than a student. But at the end of the day, once the thesis is ready, the student is the expert in that topic, in the thesis, that's what is expected.

Prof. Arun K. Tangirala: And typically, the advisor looks up to the student to give inputs on what is a next problem to work on.

Prof. Andrew Thangaraj: Yes, exactly.

Prof. Andrew Thangaraj: So, that, it is kind of a role reversal.

Prof. Arun K. Tangirala: That means you are ready to get a degree.

Prof. Andrew Thangaraj: That point you are ready to leave.

Prof. Arun K. Tangirala: The green signal is on.

Prof. Prathap Haridoss: I would also like to add to something that Arun was saying earlier, which is about know, advisor's role in helping you interpret your results. So, basically, the advisor brings experience; experience in that area, and in that relationship as an advisor and a student relationship. So, at least in earlier days of your PhD, I mean as Andrew said, by the end you have more experience and knowledge in that particular aspect of what you are examining. But, in general, and the earlier days of a PhD, your advisor has a lot of experience in that area, and so, when you present results to him or her, and you discuss the results with your advisor, often the advisor's role is to help you have perspective on what your work is. So, sometimes as a student because you do not yet have enough experience in the area, you may tend to give lot of importance to a particular aspect of your result. Whereas, the advisor maybe in a better position to tell you that, that is not the most critical aspect of that result that you are presenting whereas, something else maybe more interesting. So, of course, this gives you an opportunity to

discuss, to consider your ideas again, and maybe, you know, bounce your ideas of with your advisor and so on, and that may help you gain that experience. The kind of experience that your advisor has had over the years is something that is getting transferred to you when you have that interaction. So, that is I think where the role of the both the student and the advisor sort of come together.

Prof. G. Phanikumar: Yes, one word about attitude also. I want to say that when it comes to the attitude, we must have a very healthy attitude on keeping the long-term objective. But then, doing things on a day-to-day basis in a very steady fashion, keeping the journal, and then moving forward in an incremental manner. There is something called Obsessive Compulsive Disorder, where a person wants something, and they want it immediately, urgently, and then smallest obstacle, then the person is totally away from it. Definitely, you know one should be under that kind of an attitude. You must be able to keep the long-term goal in mind.

Prof. Arun K. Tangirala: Be patient.

Prof. G. Phanikumar: Be patient, then keep chipping away, and then you finally, make your thesis.

Prof. Arun K. Tangirala: So, be patient; do not become a patient.

Prof. Prathap Haridoss: So, maybe now, maybe you talk about it.

Prof. Abhijit P. Deshpande: That brings to actually this, what Phani was just saying that you know, you keep the long term in mind, and with that long term in mind is where, enquiries come up, postulates come up. I mean you start thinking, you know, what can I do? And that basic spirit of enquiry needs to be at the basis of all of your research that you are doing.

Prof. Andrew Thangaraj: Yes, that is the key difference between a course-based program and research-based program. You learn about something, but you do not stop there when you do research. You have to ask questions now. You have to ask: what else can I do in this field? For what else are people doing in this field currently? How else, what difference can I make to what they are doing? And then, you say maybe if I try this, this will happen. So, that requires first of all, some sort of an intuitive understanding of the

blocks of, I mean, intuitive understanding of the different ideas that make makeup that area and you will say, if you change this idea a little bit that might happen. So, you should be able to analytically reason out, ask the right question, postulate some answer, and then, check it out and then.

Prof. Arun K. Tangirala: I think an integral element is persistence; and in fact, this key thing called persistence appears even in data driven modeling. Of course, I am talking more technical stuff now, but we say that if you want to really build a model - mathematical model of the process - the inputs have to be persistently exciting. So, I keep saying this to my students that the inputs that you are giving into a research are the questions, and you have to really keep persistently thinking, thinking just as the way you are trying… you are basically hunting for a treasure which is buried underneath the soil and you cannot really say, well I will dig a few feet today, and I will come back a few months later, and then you have to again restart all over again, collect your thoughts and so on. So, I think persistence and patience, and it is a complicated thinking that is happening in your mind. It is a wonderful dish, but you know, when, before the dish comes out to you it is all boiling and it is all chaos, but when, you know, when the stove is switched off, and when the dish settles down, then it comes out to a very nice taste. So, there is going to be chaos before clarity comes in, for sure in the session, you have to be really able to persist though that chaos and sustain that with the hope of finding the clarity.

Prof. Andrew Thangaraj: Yes.

Prof. Arun K. Tangirala: Then, when you get that clarity, the joy is unbounded and that is what I think makes research, drives research.

Prof. Andrew Thangaraj: That moment when you…

Prof. Arun K. Tangirala: Yes. Yes.

Prof. Andrew Thangaraj: Something clicks in.

Prof. Arun K. Tangirala: You will forget, it is like climbing Mount Everest and people have forgotten all the pain that have gone by.

Prof. Andrew Thangaraj: Everybody, every researcher works for that moment; this is

little bit of a moment. But, I have been saying the difference between the regular course work and research work, but let me point out one thing which is often over looked by people which is actually very similar what you should do in research, which you do regularly for course work. For most courses, good students have a notebook, and they have notebooks, and that notebook ends, they take another note book, that is very important in research. So, do not think that just because the research is different from course work I will not have a notebook. You will find very few serious researchers, who do not have a notebook, everybody has a notebook. They keep taking notes, they keep looking at something. It may not be a physical note these days, it might be electronic for some people, but there is those notebook and it is irreplaceable. You have to have a notebook with you, keep noting down, work on something, very regularly, every single day, more time is spent on something, more results you will get, absolutely no difference.

Prof. Arun K. Tangirala: I think in research, you have to be prepared to ask even silly questions. There is nothing like silly questions, but even at some point you may question your own knowledge of what you thought you understood for years and suddenly you come to a point and say did I really know this. Or sometimes, I even say that maybe you sit down and ask is really 1 plus 2 equals 3 and so on. I mean there are points, you go through some real moments like that, and you just be prepared. The other integral part of research, I would say attitude is to be able to take feedback from what you can. I think feedback is a very, very integral part. Feedback from your meetings with the advisor, feedback from your own results, feedback from the mistakes that you make; everything, even your success gives you a feedback, everything.

Prof. Andrew Thangaraj: So, there is one student of mine I remember he said, no I really enjoy working in this area, I thought it will be exciting and everything, but after doing research I realized that about 80 percent of my time I am not doing the exciting stuff, doing the exciting stuff only 20 percent of the time. 80 percent of the time I am doing either coding up a simulation or doing something.

Speaker 3: It is 80-20 rule.

Prof. Andrew Thangaraj: It is a lot of drudgery and routine, and that is actually common for every field; you look at Sachin Tendulkar on the cricket pitch that is 20 percent of his time.

Prof. Arun K. Tangirala: True.

Prof. Andrew Thangaraj: So, 80 percent of his time, he is practicing some nets.

Prof. Arun K. Tangirala: Yes.

Prof. Andrew Thangaraj: Doing in the nets. So, that is what happens in every single area. You might enjoy it, I am sure; Sachin Tendulkar enjoyed his cricket, there is no doubt about it, but it involves an equal amount of routine, and you have to be ready for that even if you really are passionate and you enjoy your area, you have to be ready for the routine.

Prof. Arun K. Tangirala: He has perhaps done a lot of research on how the ball comes and so on.