

CORRESPONDENCE

Ph D students, research supervisors and university research: Some observations

V. Sitaramam in his opinion 'Dynamics of the psychology of Ph D students and the question of what to do with them' (*Curr. Sci.*, 1995, 68, 779-783) has considered only a part of the university research scenario. It is essential to look at the system as a whole. The foregoing account is based more on observations than useful statistics (which anyway is difficult to come by).

It is true that most of the research in the country (good, bad and *not so beautiful*) is carried out by research students. But they do it under the 'guidance' of their guides (research supervisors). Hence it is necessary to have a look at both these groups, Ph D students and the research supervisors, and the role their interaction plays in university research.

Students opting for Ph D can be grouped into two broad categories: (i) Those who have passed the UGC/UGC-CSIR NET (with a minimum assured standard) and (ii) Those who have not passed the same (nothing can be said about this category which may even consist of some persons having no academic merit, whatsoever).

The first category consists of two types of students: (i) those opting for Ph D because of their interest in the subject and interest in research, and (ii) those opting for a Ph D because of unemployment. The latter group is interested only in the money (the stipend), and considers Ph D programmes as employment. Students belonging to all categories get accepted for Ph D in our universities. This is because there are more unwritten laws belonging to the same category as Parkinson's fifth (?) law, which govern our university system.

One of these laws states '*Students opting for Ph D programmes can be graded on a scale of 0-10 on the basis of their intelligence/ignorance and competence/incompetence, and for every student there is a guide of the required level of competence/incompetence*'. This great miracle is possible because of another law which states '*When the authorities are interested, there is no dearth of subject experts of required degree of compliance who are ready to doctor the premature birth of anyone as a university teacher*' (a modified version of this is applicable in promotions). The Parkinson's fifth (?) law quoted by Sitaramam obviously is an extension of these two laws.

The trend of those scoring very high marks in 10th and 12th level opting for professional courses has been '*in*' for a long time. Hence the present generation of university teachers (research supervisors) is also drawn from the layers lying below the '*top-most*' layer.

The research supervisors (especially in the university set-up) can be grouped into three categories on the basis of their selection.

1. *Selection (purely) on the basis of merit.* This group consists of the best students returning from universities abroad, national institutions, from IITs, from the same university or other Indian universities. They have excellent academic records and have worked on good topics, with good guides, in good institutions. They have a good exposure, and have a deep interest in research (in specific areas). They co-operate well with the students, work hard, and publish frequently in good journals.

2. *Selection due to inbreeding.* In case of this group there is some compromise on the quality. They are better students from the same university, mostly students of those in authority. They also have a reasonably good exposure, are in general interested in research and helpful to the students.

3. *Selection due to favouritism.* In case of this group there is a heavy compromise on the quality. They have average or below average academic records. Mostly close relatives of those in authority, politicians or their friends, they have somehow managed a Ph D, have little exposure, are not much interested in research but do research because of compulsion (others are doing it, some research is necessary to justify the presence in the university environment and for promotions).

The fate of the Ph D student depends much on the guide he/she selects.

Fresh M Scs have enthusiasm. They want to do research but most of them do not know what exactly to do. They are in a state of *infatuation* with science. It is up to the guide to transform this *infatuation* into a true love for science and his/her initial interaction with science as a meaningful and long-lasting love affair. In other words, to understand that Ph D is a training programme and to guide and mould the student into a first rate researcher. Most of the research topics are suggested/selected by research guides. Fresh M Scs cannot be expected to come up with a suitable Ph D problem. No research is an end in itself. Most of them raise as many questions (if not more!) than they answer. Because of this, a guide having deep interest and

working constantly in any field will have enough problems for fresh students.

Now the question arises: 'What can be done to improve the situation?' Three things can be done:

1. The selection of the university teachers can be made more rigorous, if possible at the national level, than relying on local selection committees.

2. The UGC/UGC-CSIR NET can be modified with more emphasis on research aptitude, and

3. Universities can introduce entrance test for those who have not passed UGC/UGC-CSIR NET/GRE/GATE etc. for registering for a Ph D.

About the dynamics of the psychology of research students, I am aware of one. All students start their Ph D programme with an intention (hope!) of completing it in 3-4 years. Some of them who have

teamed up with *not too enterprising* guides take very long (7-8 years). It takes 2-3 years for the student to realize that the guide is not very helpful. The student continues because he/she feels that in another 1-2 years the work can be completed. And it is better to spend a little more time than losing the efforts already put in for 2-3 years. After another year if the situation still remains the same, the student continues. As time passes, the time required to complete Ph D becomes increasingly a lower fraction of the time already spent. There are societal compulsions also (of relatives and friends scorning 'he/she is not intelligent enough to get a Ph D'). The end of this prolonged (perennial) suffering is when both the student and the guide get totally fed-up, and the guide decides to resort to the Parkinson's fifth (?) law. This leaves an incompetent guide with one

more feather in his/her cap (of having produced one more Ph D) and a student who has lost all interest in research (possibly some interest in life also), overaged with a Ph D degree which at present does not have a ready market.

Finally, I would like to disagree with Sitaramam in his suggestion that we should plan our programmes on the basis of the average performers. In my opinion we must strive for excellence and excellence alone. Planning on the basis of average performer results in compromise. Compromises make more compromises necessary. And all these compromises spoil the system.

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SCIENTIFIC CORRESPONDENCE

Recent finds of ancient gold mining sites in south Uttar Pradesh

A prominent ancient gold mining site was recently discovered by the authors¹ in the Precambrian Shield region of Uttar Pradesh. It is located about 2.5 km west of Gurmura village in Sonbhadra district (Figure 1). The clusters of old workings are spread over an area about one km in strike length and over 600 m wide. It can be divided into northern, central and southern parts. The northern part shows seven elliptical to rectangular trenches measuring up to 30 m × 10 m × 10 m in size with an incline aimed to exploit easterly plunging ore body. The main hillock, locally referred to as Sona Pahari, forms the central part of the area of old workings. It has large trenches, the largest being about 60 m × 10 m × 10 m located on top of the Sona Pahari. The southern part extends over a length of about 500 m. This has two main trenches. The larger measures about 30 m × 5 m in plan. Both the trenches have inclines. Mishra² had speculated about the possibility of gold mining at Sona Pahari (golden hillock) on phonetic connota-

tion and also on the basis of its location in the provenance of Ashokan rock edicts, which are strikingly common in gold-bearing regions of India.

Regionally, the early to middle Proterozoic rocks of southern UP, correlated with the Bijawar³ Group, rest over a granitic basement, viz. the Dudhi Granitoid exposed to the south, and are overlain by late Proterozoic Vindhyan sediments exposed to the north (Figure 1). The area exposes a dominantly argillitic sequence with minor graywacke-arenite intercalations referred to as the Parsoi Formation⁴ of Bijawar Group. The argillites show E-W to ENE-WSW-trending foliation with high dips generally towards south. The succession of metamorphosed chemogenic sediments comprises banded hematite quartzite/jasper, banded magnetite quartzite; argillite sequence consisting of phyllite-graywacke-arenite units and the associated volcanics consisting of a suite of basic to ultra-basic phases, agglomerates and tuffs. The Group compares well with the Precambrian Green-

stone Belts⁵. The argillite sequence is intruded by a number of quartz veins with sympathetic trend emplaced probably synchronous to the emplacement of a granitic pulse, viz. the Jhirgadandi granite, in the adjacent area. The mineralized quartz veins are oxidized on the surface and exhibit pyrite, arsenopyrite and galena. Narrow zones of wall rock alteration, indicating carbonatization and kaolinization, signify hydrothermal action. The mineralization appears to be controlled by E-W to ENE-WSW-trending folds and the ancient miners seem to have excavated the richest portion of ore emplaced along the axial-plane shears of the doubly plunging folds with plunge around 35°.

The analytical results for the major trace elemental contents of 50 surface grab samples collected from the area indicate the presence of gold and silver along with other associated metallic elements. Forty-three per cent of samples analysed by Atomic Absorption unit at chemical laboratories, Geological Survey of India at Lucknow, Hyderabad