What should be the difference(s) between a college, university and a research institute?

I feel a debate/discussion is warranted on 'What should be the difference(s) between a college, university and a research institute?' so that these three levels of educational institutes can rightly evolve and cater to the needs of the society/nation in the new millennium.

The country should first come to a consensus as to how many universities and colleges it should have for a population of one billion plus. How many students should each university and college have? What should be the different programmes? Should these programmes be identical or different between a college and a university? How many students should be brought into each programme? In what manner should a programme be run? (For example, an M Sc programme may be run with or without a dissertation; a Ph D programme may be run with or without a course programme, etc. How should the teacher–student ratio vary in a college and a university? Should colleges continue to be affiliated to universities? If not, who should regulate their functioning? If yes, to what extent should colleges abide by the universities? Can a teacher with M Sc/MA qualification teach M Sc/MA students or do you expect the teacher to possess a Ph D to teach them?

Once upon a time colleges were meant only for undergraduate (UG) programmes and universities for post-graduate (PG) programmes and Ph D/D Sc research. The faculty in the research institutes were exclusively devoted to research by themselves (i.e. without the help of any Ph D students). A while later, colleges started a few PG programmes and some universities started a few special UG programmes. Of late some are of the opinion that universities also should start their own UG programmes as they are likely to be of a higher quality than that of colleges. Is this going to happen?

Now we have colleges rolling out a very large number of PG students than universities. More and more colleges are likely to follow this trend. Colleges run many PG programmes which a university normally runs. Faculty in colleges also register Ph D students and apply for research projects. (And this tendency is likely to increase.) In some places, the teaching load of university faculty is similar to colleges or even more. On the other extreme we also have some non-teaching departments in universities, i.e. which do not run any UG/PG programmes but register only Ph D students. Many faculty in the university have no research funding for most of their career.

We have research institutes regularly taking varying number of Ph D students and some participate in teaching programmes also, at M Sc/Ph D level. More and more research institutes are becoming eager to undertake Ph D students. Further, once someone made a recommendation that all the research institutes (particular reputed ones) should start their own M Sc programmes in different disciplines as they are likely to be of a higher quality. Is this going to happen? (All these may be advantageous to students but is tantamount to serious deprivation of the universities of funds, good students and good working hands.)

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Efficacy of scientific gatherings

By comparing International Botanical Congress (IBC) with Kumbha melas, Ganeshaiah[1], in an entertaining way, has mooted a point for serious thinking. The scene of Indian Science Congress presents enough to Indian scientists who have not yet attended the IBC or other international gatherings. While suggesting to kill the large gatherings, Ganeshaiah is in favour of promoting smaller ones. Congresses, conferences, symposia and often the so-called workshops or training programs have been fashionable activities for scientists. Least thought is given to the matter of their producing desired results. Although concentrated on only a single point, i.e. the low performance and lack of presentation skill, the editorial[2] in *Current Science* points towards the same direction as also hinted by Chatterji's collection of usual phrases in his 'Millennium meetings' in the same issue[3]. Despite a huge financial and selected human resources involvement, these gatherings are far from achieving what they are intended for. The matter deserves analysis from different angles.

First a brief comment on presenting science. Presentation skill largely depends on two factors: experience and exposure. Of course, understanding of the subject matter, clarity of views and command over the language are the first requirements. There are a number of universities which offer courses in library reading and seminar at graduate and post-graduate levels, clearly intended to impart the reading habit and presentation skills to the students. However, in many cases the period allotted for library reading practically becomes a relaxation period for the teachers, and least attention is paid to what the students are doing, except collecting a few pages in writing from them. Presentation skill is highly improved by imitating and later emulating good speakers, although many universities may not be able to provide the required environment where students are exposed to

good speeches. Still we can hope, if proper attention is paid to the realization of the objectives of library reading and seminar courses at graduate and post-graduate levels, the problem of poor presentation might be mitigated and thus the meetings (symposia, etc.) be made more useful. Clearly our attempt should not go towards killing the meetings but towards finding a way to improve their practical utility.

Relevance of big scientific gatherings is comprehensively stated by Y. K. Gupta[4]. However, his comparison of big conferences with an old man is not apt. A professional society and its activities die only when the context and the norms and values on which the society was established are changed in such a way that the society itself becomes irrelevant. The shortcomings that are observed can be improved by appropriate changes in functional style, and bringing efficiency in managerial and organizational aspects.

One aspect of concern which is not raised in the above-mentioned articles and only occasionally touched upon in other writings dealing with various aspects of degradation of science in India is the financial involvement, particularly the cost effectiveness of such scientific activities. A part of the gathering expense is borne by the participants, i.e. by a number of young scientists. Compelled by their desire to build up a career, young scientists are often ready to pay membership and registration fees and bear other expenses to attend these fairs. In return they get an additional line added in their biodata and some inspiration, of course. Many of them also pick up some ideas from the abstract book on their hand and start to work on that line. Whoever the sponsor, most of the expenses incurred in these gatherings come, in one or the other way, from public money. Nobody cares if the investment is productive and is utilized in a proper way. The non-scientific community watches these events amazed. They understand science in terms of miraculous discoveries that revolutionized their living world. They really do not understand (but still admire) day-to-day activities and the publications of the scientists which are understandable only to a narrow circle of peers with vested interests. And this really makes science expensive and allows wide room for fraudulent work. However, submerged in the mass of bogus scientific activities are a few genuine scientists who frequently find something which not only affects the whole of the human life but is also immensely productive even in monetary terms. And the production of these few scientists supports the whole mass of a fraudulent scientific world and its bogus activities.

Scientific gatherings are inaugurated by some political leader or a high-ranking administrator. Success is often measured in terms of the person whom they could invite for inauguration (closing) or as a chief guest. The politicians should have borrowed and followed the statements of scientific academicians. But usually scientific gatherings prefer to follow a slogan or theme which is in current fashion among the politicians. We do not mean that Indian Science Congress should stop to invite the PM for inauguration but think what a difference it will make if the Congress is inaugurated by a Nobel Prize-winning scientist. It is not unusual to see an academician revolving around a chair held by a politician or an administrator. Gone are the days when the king was worshipped only inside the boundaries of his country while an academician was welcome worldwide. Today rarely does a scientist dare to become Viswamitra or Durvasa[5]. Instead, even for 'big' scientists, politicians often function as a sacred cow hanging on whose tail they can cross the river Baitarani.

While organizing scientific gatherings, organizers usually aim not at improving science but to show the Government or other funding authorities that they are doing something great. They wish the planners and policy makers to direct financial activities in such a way that their narrow scientific circle gets monetary benefit for whatever they are doing.

In this way there are problems in bigger as well as in smaller gatherings. However, the solution lies not in killing them but in the involvement of the scientists themselves to find a way by which scientific gatherings could meet their real objectives.

1. Ganeshaiah, K. N., *Curr. Sci.*, 1999, **77**, 739–741.
2. Balaram, P., *Curr. Sci.*, 1999, **77** 1005–1006.
3. Chatterji, D., *Curr. Sci.*, 1999, **77**, 1011.
4. Gupta, Y. K., *Curr. Sci.*, 1999, **77**, 1024.
5. Haldane, J. B. S., *Curr. Sci.*, 1999, **77**, 305–307.

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Nuclear war

I would like to respond to your editorial of 10 November 1999 justifying the rejection of what was most probably my paper on the effects of a hypothetical nuclear explosion over Mumbai, which was submitted in March 1998 upon the advice of a member of the editorial board of *Current Science*.

There were three main reasons why I thought it was appropriate for the readers of *Current Science*, and the larger scientific community.

1. Thus far, there are no *detailed scientific* estimates of the damage from a nuclear explosion over South Asian cities, which have the special feature, as your editorial pointed out, of being densely populated. Earlier work,