

MICRO-STUDY 1

Autonomy and Inter-Disciplinary Integration in Undergraduate Education - A Micro-study of Four Institutions in Bangalore

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**Report of the micro study conducted in MES College, Christ College,
PESIT and University of Agricultural Sciences in Bangalore**

The micro study was part of a larger project on Higher Education funded by the Sri Ratan Tata trust, conducted by the Centre for Contemporary Studies, Indian Institute of Science. The aim of the study was to look at the scenario of undergraduate education in Bangalore, with particular reference to questions of autonomy of institutions and integration of courses. The integration question in this micro-study was specifically directed to the issue of integration between Social Sciences and Natural Sciences.

Methodology and respondents

For the purpose of the study, four institutions in Bangalore were chosen - *MES College*: a traditional Arts and Science College, *PESIT*: an Engineering College about to be given autonomous status, *Christ College*: an autonomous Arts and Science College, and *University of Agricultural Sciences [UAS]*: an autonomous Agricultural university with integrated programs. The idea was that the autonomous status of the last two institutions would provide a contrast to the first two institutions.

Qualitative interview methods were used to gain impressions from the students faculty, and administrators, whenever possible, in all the institutions. In UAS, MES and Christ College, we also distributed questionnaires among the faculty and students. As it happens with questionnaires, less than half of the 200 odd questionnaires distributed (in the various institutions) were returned.

Final year students from the Biotechnology Department, which is considered the interdisciplinary course in an Engineering college, of PESIT were interviewed. In MES, we spoke to students majoring in Botany-Zoology-Chemistry, and to students from Economics-Psychology-Sociology and Commerce streams, as well as post-graduate students from Mathematics. In Christ College, the questionnaires were given to second year students from Computer science, Commerce, and Economics streams – these students were the first batch under the autonomous scheme in Christ College. In UAS the questionnaires were given to the final batch of Degree students in Agricultural science,

and to some PG and research students. In this manner, the attempt was to cover all groups of students in the said institutions.

The faculty from the Biotechnology department of PESIT was interviewed. In MES, faculty from the department of Economics, and Botany was interviewed. In UAS, a wider variety of faculty – from English, Economics, Genetics, Entomology, Sociology, and Physics - was interviewed. In Christ College, only the Journalism department faculty could be interviewed.

The Economics curricula were collected from MES and UAS, to give a comparative sense of core and outside subjects. Both curricula have been recently revised.

Responses

The students were given/asked a common set of questions in all the institutions, after the purpose of the questionnaire itself had been explained to them. The responses from the various colleges were different. The reports from the various institutions are given below. The questionnaire contained questions on the courses being taken by students, their reasons for choosing particular courses, their plans for higher studies or jobs after the course, their attitudes towards career change, their response to extra courses and the question of integration, their understanding of and suggestions for the prevailing system and their response to the research methods in the subjects they had chosen to study.

Responses from Mysore Education Society [MES]:

25-odd students were given an introduction on the micro study being conducted and asked questions based on the prepared questionnaire. The first question was on the academic route through which the students had come to the present degree course. All of them had done a conventional Pre-university course, which included Maths, Physics, Chemistry and Biology. The particular degree course that they have opted for admitted students from that particular academic background alone. Most of them had not thought of any particular job option after this course, partly because there were not any jobs available to them after a conventional degree course. Many of them wanted to do

research in subjects like Biochemistry, Microbiology, Biotechnology, etc. after this. Teaching was not seen as a particularly lucrative career option.

The students were asked about their desire to change the direction of the course after this and they did not seem particularly keen on that. They wanted the option to choose add-on courses which would help them later on, like Bio Informatics, Computer Science, Criminology, Statistics, etc. that were presently not part of the curriculum. Some students wanted Psychology to be an option because of a general interest in the subject; this interest was more strongly expressed by the female students. Four students had attended a six-month course on Genetics from St. Joseph's College. The affinity towards extra-curricular courses was in the direction of science-related courses rather than the Social Sciences.

The Bangalore University syllabus, which MES College follows, has a paper on the Indian Constitution that is compulsory for Science students. Most of the students were not interested in the course. It was seen as an imposition on students with only one student thinking that it was necessary for people to be aware of the law. Since the rationale behind introducing such courses was not explained, the students felt that such courses were not required.

The students had not thought of integrated courses at all, and the response to having such courses was lukewarm.

The students who were given the questionnaire were mostly from the Economics, Psychology, Sociology and Commerce streams. Not many of them were thinking of changing their stream. The reason they cited for taking up their current course was due to the non-availability of any other options in MES College (as the college can only offer university specified courses). Not many of them did any reading outside their syllabus, but most felt that there were courses which they had done in school which they would like to continue doing, not just for their usefulness, but also because of interest. A computer applications course was something most of them felt they needed, even students from the Humanities/Social Sciences (who do not have such a course), as it was deemed necessary to have computer skills to go out and work.

The students did not think that the present syllabus was a burden on them, though they felt that courses like Indian Constitution, although necessary, should not be imposed

upon them. The general sense one gets from the questionnaires was that the students would have preferred to have more options and combinations than the ones offered by Bangalore University. Autonomy was perceived as good, as many felt that it would give individual colleges the chance to change the courses according to the needs of the students. Concepts like gender and politics were perceived as being present in the Sociology Course, but some students felt that it was not adequate. The students felt that the PG course did build up on their UG courses, and welcomed the chance to have integrated courses.

In extended conversations, older and newer faculty lamented the lack of interest shown by students in activities both inside and outside the curriculum. While some of this was put down to the general effects of ‘globalisation’ – easy money, the disjuncture between highly paying jobs in the IT sector and the education they were receiving – another strong position was that a lack of thought while drafting and putting in ‘new’ courses which the teachers were in the first place ill-equipped to teach, and underpaid for, only resulted in confusion. In that sense more was not always better. The curricular subjects themselves required more competent teaching.

Responses from Christ College:

Most of the students who responded were from a Science background, so there was no possibility of changing their academic route, unless they decided to do an MBA after their graduation, which some of them were thinking of. Some were Social Science students who had done Physics, Mathematics, Chemistry, Biology for their pre-university. These students opted for Social Science partly because of interest, and partly because they did not score high in their Mathematics paper. All the students in the science stream said they chose their particular combinations out of interest. Christ college has certain set combinations of subjects like Computer Science, Electronics, Physics or Electronics, Physics, Mathematics, or Economics, Psychology, Journalism, etc. There is no option for a Social Science student to take Mathematics or for a Science student to take Literature as one of their core subjects. Some of the students did express the desire to avail of this opportunity, as it is present in certain foreign universities.

All the students who filled in the questionnaire perceived the autonomous status of the college as good, although one student did think that the only difference it made was in the way examinations are conducted. Christ College has many certificate courses which are offered outside the syllabus, and so students invariably end up taking some of the courses. None of the students found their present syllabus a burden. Many of them were interested in theatre and psychology. And most of them were open to the idea of doing more courses outside the syllabus, which would help them later on. The students seem to think that issues like gender and politics should be an intrinsic part of the syllabus, more than it is currently so.

The faculty thought that the students did show an interest in courses outside the syllabus. Sometimes they had to speak to the students before they would sign up for certain courses, but the courses had takers. The college did not have many certificate courses before autonomy was granted. The autonomous status had given them freedom to offer new courses, though often these were outside the syllabus. The younger members of the faculty were more interested in offering such courses, probably because they had the time. One of them thought that if the remuneration for teaching such courses were increased then the other teachers might also show interest in offering new courses. The general opinion was that teachers too need training if they are to teach disciplines different from their own.

Responses from PESIT:

Six interviews were conducted. The first one was conducted between the interviewer and a group of 30 students from the eighth-semester Biotechnology stream. The interview was conducted in the presence of a faculty member. The students were asked a series of questions and were asked to respond collectively.

All except one student had done a Pre-university course with Physics, Chemistry, Mathematics and Biology. The one exception was a student who had done Electronics instead of Biology. The students were not very satisfied with the present Biotechnology Course, mainly because of the job factor. There are not many job opportunities open to this particular branch of Engineering. Many of them already had placements in IT

companies, which is a different field from the one they study. A minority could hope to get into biotechnology companies, or could pursue higher education in the field of genetics, biotechnology etc. Most of the students wanted the course to be revamped as there were repetitive papers and not enough practical experience gained that would land them a job.

When asked about their reading habits, all the students said they read books. When asked specifically about books related to their course, but not prescribed in the syllabus, the students answered in the affirmative. There are not sufficient prescribed textbooks for this course, so the students have to find other books. Their library was cited as being excellent and as meeting the requirements of the course.

Since PESIT is not yet an autonomous college, the option of audited courses is not available yet. With autonomy being put in place by August 2007, some of the courses are going to have the credit/audit option.

When asked about any desire to change the direction of the course after their B.Tech, most of the students were planning to do that. It was not because they were unhappy with what they were doing, but because of the low percentage of jobs available in the same field.

The college has a programme called TSDP (Total Student Development Programme), whereby on Saturdays the students can come to the college to attend practical sessions on various techniques/technology which are not covered in the syllabus, but which would be useful for the students. TSDP was seen as an opportunity to give the students an edge and familiarise students with techniques they would later use in various industries. The TSDP programme though looked at positively has had some problems in terms of attendance, which the students identify as being the result of making it compulsory.

The students were all for the college becoming autonomous. They saw it as an opportunity for the syllabus to be made compact and job oriented, and as giving an individual student the option to choose between courses.

When asked about integrated programmes, the students understood them as student exchange programmes and were interested in the idea.

They had many suggestions for the interviewer and the college authorities in general. One was to limit the student intake as demand for Biotechnology students was limited. The second was to seriously consider student input when autonomy is finally put in place. The third suggestion was to provide opportunities for the students to do internships or other ways to gain practical experience.

Of the five members of faculty who were interviewed, one was a faculty of the M.Sc. Biotechnology course which was part of the PES Degree college, housed at PESIT. She had to teach new courses that were not part of her UG or PG training. She taught the students Environmental Laws and Bio-safety, which was more of Law than Biology. She also had to teach Environmental Science to Computer Students and she said it was difficult to get the students interested in this subject, as they did not find it immediately useful or necessary. The subject is not compulsory and so the students do not take it seriously.

The other teachers who taught varied subjects like Biotechnology, Bio Instrumentation, Bio Ethics, Reactionary Principles, etc. said that the students were interested in certain courses. They all welcomed the idea of teaching courses with new components in them, particularly the younger faculty. They did mention that it might be difficult, but what they could not teach themselves could be learned through some kind of training programme. Most of them preferred to have such a programme on campus, but if that was not possible they were open to the idea of having it in some other place, for the duration of a week or so. Many of the faculty members were teaching subjects they had not studied themselves; especially with the coming of autonomy and the revamping of the courses, they were dealing with changes in the existing university-college structure.

Responses from University of Agricultural Sciences:

The interviews were conducted with faculty members from the disciplines of Entomology, Genetics, Economics, Psychology, Sociology, Physics and English. Some of the professors preferred to speak to the interviewers while the rest filled in the questionnaires that were given to them.

UAS or GKVK has had integrated courses being offered to students for many years now. With the new ICSR rules, the Social Sciences component of the syllabus is being reduced to make way for new branches like Biotechnology and general life sciences. The teachers have not had to teach any new components as part of their teaching duties, except in Sociology. The Sociology faculty member had to teach the paper on the Indian Constitution to students although it is not part of the Sociology syllabus. He found it hard to teach this law-related subject and felt that he did not do justice to either the students or himself by being forced to teach it to them. From a department that had three professors, the Sociology department is now nonexistent and is part of the Agriculture Extension services. The syllabus for the undergraduates and the post graduates deal with the same basic concepts without there being any progression in the level of comprehensiveness of the content.

The English Department faculty found that students in the first year were not interested in learning English. Most students coming from rural backgrounds had comparatively poor English language skills. However, third year Agricultural Engineering students showed an interest in learning the language. The teacher's assessment was that by the time they are near the completion of their course they realise the importance of the subject and its value in their future.

The Physics department also had only one faculty member. There are very few basic science courses in the present syllabus. The teacher had to teach Applied Physics (Solar Energy, Sea Technology and Meteorology) to the post graduate students. He found it interesting to teach subjects which were not exactly pure Physics.

The professor in the Entomology department who taught only PG and research students said he would find it difficult to offer a course with new components. He said he was comfortable offering courses only in areas with which he was familiar. He was open to the idea of including experimental components to existing courses provided they were for 1-2 hours, and adequate training was given to the faculty to teach it.

The general sense was that students showed no interest in taking up courses outside the syllabus since the semester system did not allow for much free time. The only students who took up an extra course took it for the credit, and always took it up to help their research interests.

The marginalization of the Social Sciences (except Economics) in the curriculum is seen to have taken away from the holistic approach which the earlier syllabus had. Fifteen to twenty years ago, the faculty who were then students in the same university had texts from English Literature and Psychology, which were seen as interesting and useful. Students who pass out with a degree in Agriculture have to deal with farmers, entrepreneurs, customers, etc., and the lack of the Social Science subjects, according to a member of the faculty, renders the students ill-equipped to deal with them. The Outreach and Extension programmes of the University are badly hit by this.

With the shortage in funds, the library was the first place where the financial cuts were made. So, the institute is lacking in the latest journals.

There is a theatre group by the students called *Bhoomika*, which stages dramas, and the proceedings are used to help poor students. The NCC is also active and compulsory for the undergraduate students.

As of now, it seems as though the people in the University who are interested in subjects/activities which are not strictly disciplinary, have a hard time. The lack of funds for the Social Science disciplines and the move towards specialisation in the Agriculture related sciences are taking away from a holistic approach. Some of the faculty at least would like to think of some programme, like the History of Entomology, which could combine Social Science and Natural Science teachers.

The student responses suggest that the students have taken up the course due to an interest in the field. Their reading outside the course was minimal. The semester system does not give them time to take up extra courses though some of them showed interest in taking up other disciplines like Computer Applications and Zoology. Concepts like gender, politics, etc. do not seem to be a part of the curriculum, according to the students. The autonomy issue did not appear to be part of the discussions among the students. Though there are integrated courses, since they are already part of the syllabus, the students do not seem to consider them to be something different from what they do.

Impressions:

The micro-study was undertaken with a view to mirror the expressed needs within various undergraduate and postgraduate institutions with respect to the question of

integration between natural and social sciences, as well as with respect to the question of autonomy. Autonomy was generally seen by both faculty and students in all the institutions to be beneficial. In UAS, they have to follow ICSR guidelines when setting the syllabus, so the innovations are restricted. Individual faculty have to take an interest to create awareness in the students regarding materials and events outside the syllabus. With disciplines like psychology, sociology, etc. being part of the syllabus, there would seem to be one level of integration between the Social Sciences and Natural Sciences happening. However, with specialisations becoming the norm, the inputs from English and Sociology had to be reduced. The faculty thought that this was taking away from their students receiving a holistic approach to life. In PESIT and MES too the students and faculty were positive about what autonomy would achieve. In PESIT in particular, it was on the lines of changing the syllabus to give the students an edge in the job market. Integration was seen as happening between Biology and the hard sciences. Christ College had already been offering the students courses from disciplines outside their syllabus. Many courses are still offered as credited Certificate courses.

In Christ College, where students are exposed to different kinds of courses, they were open to doing new courses from different disciplines within and outside the syllabi. The students in UAS already had more exposure to different disciplines; they thought studying different subjects was good, but the inclination to do something new was not so much present in their response. MES students wanted to do something new, but related to the subjects they were familiar with in college, even if they did not have to study it, like biology students wanting to do Psychology. In PESIT, where the students were more job oriented, the integration that they hoped for was related to technology, not Social Sciences. They were not even aware of integration being possible between the Social Sciences and Natural Sciences. The students who were already exposed to different disciplines were the ones that were open to learning new subjects/courses.

The faculty response to teaching new courses/disciplines was varied. Generally the younger faculty in all institutions were open to teaching different subjects. In undergraduate colleges, like PESIT, MES and Christ the teachers did not think it was impossible to learn and then teach new course. They actually thought it would be challenging and interesting. In UAS, the faculty thought it would be difficult to teach new

subjects. They were ready to include a few new components in the courses they offered. Except for the English, Entomology, Physics and Economics faculty, the others were wary about having to put together a syllabus on topics they were not knowledgeable on. The post graduate teachers thought that since they had worked on their specialisations for years it did not make sense to offer a completely different course to students. The impression that they conveyed was that it was useless to teach students without training, as they will not be giving their best. In the undergraduate colleges, the teachers normally had a set syllabus, so learning something new was not considered impossible. In Universities since the faculty decide on the course, textbooks, etc. learning and then teaching something new was perceived as difficult.

The students from all the colleges and across disciplines asked for some computer application course to be included in the syllabi, as it was needed for any kind of job in the market.

Recommendations:

A. On autonomy and integration

As is evident from the responses of most of the institutions, autonomy is being considered a useful option. At the same time, however, there is a sense of dissatisfaction with infrastructure and attitudes that should contribute towards the implementation and operationalisation of autonomy. On integration, there is far less clarity on what an integrated course would entail, or what a useful vision of integration would be. The perceived gains of integration include connecting academic [research] and vocational [need] training – this is the case with the new technological institutes that teach courses at the interface of existing disciplines [as in PESIT, with new courses in bio-informatics etc]. At other times the rationale is not so clear; the impulse is, presumably, to give a better sense of social structures and state functioning [as in the Bangalore university undergraduate science curriculum which has extra courses on the Indian constitution]. In yet other institutions like the UAS, holistic notions of individual development and a sense of the subject matter at hand being related with other subjects, has led to the inclusion of social sciences into core natural science curricula. These three kinds of impulses have happened at both the undergraduate and post-graduate levels. In the interests of bringing

together these impressions to forge a better understanding, therefore, it is felt that a series of discussions/ workshops would be useful to build a more robust sense of both autonomy and integration. The workshops could be at various levels –

- i. Between various institutions that have opted for autonomy and those that have not.
- ii. Between practitioners of natural sciences and social sciences in these institutions, i.e. inter-departmental workshops.

These workshops should take up the task of collecting and studying the structure of and problems with existing integrated curricula, as also study alternate curricula written with different perspectives, methodologies.

Following such a series of workshops, specific subject curricula could be taken up for investigation and revision, incorporating insights on integration arising from the workshops.

B. On teacher training and curriculum building

The felt need in almost all the institutions reviewed was that teacher training needs to accompany changes in curricula and course structures. This could follow conventional methods of training teachers to teach a set curriculum, or teachers could be encouraged to actively participate in designing and teaching courses. This could effectively introduce a research component into teaching.

C. On courses

The concept of add-on courses that most institutions within university structures have, produce a ‘more is better’ version of integration which the impressions from the micro-study indicate is not useful. On the other hand, the experimental courses taken up by the autonomous institutions also work with ambiguous notions of integration. It would be useful, therefore, to give more thought to integrated courses through the setting up of work teams that would look at specific existing curricula, and through structured feedback programs.

D. Library resources

Institutions participating in such moves on integration will need support and brainstorming on improving library collections.