Story of COEP's Transformation through Autonomy

It is often asked in academic forums, "What makes an institution succeed and excel?" There are many facets of an institute's functioning that need to be addressed and 'tuned' to succeed. The story of the transformation at COEP is narrated here in the form of a case study, in order to share our experience with other institutions, which may have similar origins and, like us, are ambitious to succeed.

THE PAST

The College of Engineering, Pune, fondly called COEP by its alumni, students and faculty, is the third oldest technical institute in Asia. It was started in 1854, and produced alumni like Bharat Ratna Sir M. Visvesvaraya, in whose honour Engineers' Day is celebrated in India; Prof. Thomas Kailath and Dr. C. K. N. Patel, two eminent engineers from India decorated with the coveted IEEE Medal of Honour and scores of others. However, in a highly competitive world, if the momentum to excel is not maintained, and autonomy is not available to pursue the institution's own goals, an institute – even one of excellence - can decline. This is what happened at COEP through the decades of the eighties and nineties, and by the year 2000, the institute had only its history to cherish!!

As is well known, one of the key requirements for a high performing institute is to have the freedom and autonomy to pursue the institution's mission, purpose and goals. Autonomy (with proper accountability) should be total in terms of all key facets of its work viz., academic, administrative, managerial, and financial. Quite often, a private self-financed institute has all these autonomies except academic. But, it is the Government colleges that do not have any of these autonomies. Many may wonder what essential aspects of autonomy were missing at COEP? And what could not be done prior to the granting of autonomy. Some key examples mentioned below reveal the predicament of COEP in the pre-autonomy years, and how these stifled its growth:

a. Faculty recruitments at COEP were made through the State Public Service Commission. The institute had no say in the selection. Moreover, as this was not considered a priority area, advertisements for faculty positions and recruitment initiatives were not taken up for many years. Thus many positions remained vacant year after year leading to poor teaching quality and academic development - leaving COEP poorly resourced to meet the 21st century challenges of the country.

b. Yet another problem associated with COEP faculty was their frequent transfers in the State, from one Government institution to another, resulting in a lack of long range career planning and faculty development leading to a lack of motivation for faculty to take up challenging academic/research activities and to plan and execute programmes in new and emerging areas. This also resulted in the relative backwardness of COEP by the year 2000.

c. Financial powers vested in the Principal, COEP were also very limited; i.e., Rs 5000/- which restricted institutional functioning in areas such as: equipment and consumables procurement, maintenance of infrastructure, ensuring campus cleanliness and security - all essential for good academic discipline and development on the campus. This also resulted in successive student cohorts not gaining the full benefit of the emerging ICT revolution taking place in India and around the World during this period.

d. Another aspect that also affected COEP, like many other Government institutions, was the prevalence of a 'single entry' accounting system, with all the incoming monies going into the State Treasury and subsequently requiring huge efforts from the College administration to withdraw even small amounts for meeting the permissible expenditure. As a result, administration at COEP was neither effective, nor efficient, and such a system limited and demotivated the faculty to make any effort to raise additional income revenue generation (IRG) for the institution.

e. Receiving contributions/funds from alumni or industry for institutional developmental was also not conducive in this period, as donors and sponsors could not be assured of the use of their donations for the purpose for which they were intended. As a

result, COEP derived little benefit or support from its stakeholders, unlike many other leading institutions in the country.

f. Another important issue in this period was a lack of proper governance, as it was primarily a bureaucratic structure of the State Government; with the Higher and Technical Education Department, headed by Principal Secretary and assisted by the Director of Technical Education, undertaking all governance and accountability functions. All administrative processes were highly bureaucratic and archaic, and with few powers delegated to the COEP Principal, expectations of high performance were implausible

It is in this context that two events happened, in the case of COEP, in 2002.

Firstly, a Report by a Committee set up by the Government of Maharashtra under the Chairmanship of Dr. F. C. Kohli, an octogenarian and well known as father of the software industry in India suggested in 2002, that four government engineering colleges in Maharashtra, COEP being one of them, should be given autonomy. Around the same time, the World Bank-funded project "Technical Education Quality Improvement Programme (TEQIP)" was unfolding in India, which also insisted on institutional autonomy as one of the requirements to be fulfilled for selection under TEQIP.

Thankfully, due to both of these initiatives, and the progressive State Government of the day, full autonomy was granted to COEP; an institution which unfortunately had nearly collapsed by 2002. The autonomy given by the Government of Maharashtra for the four TEQIP participating institutes in the State was total; i.e., academic, administrative, managerial and financial, although the same provision was not extended to other TEQIP institutes in Maharashtra. Also, few other TEQIP institutes all over India had this privilege, except the centrally funded institutes like, the National Institutes of Technology.

Another extremely significant and important thing happened, and that was the handing over the reign of COEP to a well-constituted Board of Governors headed by Dr. F. C. Kohli who insisted on having highly experienced members, (with expertise in academia, science, technology, industry, finance, human relations and other related areas), nominated to the Board.

Dr. Kohli did not stop at the selection of the Board members. He also requested that each of them gave their full commitment and time. Each one was requested to give at least 2 hours a week to COEP in order for the institution to make a total turn around. He believed this was necessary and that it would be important for each of them to focus on an area of the institute's functioning, related to their own expertise, if they were to make a real difference in a short time. This time commitment was in addition to routinely attending once-a-quarter Board meetings, which happens in all the colleges. Each member of the Board duly gave the commitment and lived up to Dr Kohli's expectation, particularly in the early years of autonomous status. The Chairman, too, was very active and was in touch with the institute's administration (and met students and faculty) on a regular basis.

Dr. Kohli's following statement at one of his meetings at COEP in that period makes great sense: "If India has to succeed, quality engineering education is the key. Quality can be achieved provided there are good quality teachers with PhD Degrees. Hence instead of producing 600 PhDs in engineering, India needs to produce 6000 PhDs a year. If IITs produce 3000 world-class engineers annually, that is not enough for a country of India's size (three times the US, with three times the number of bright students). India needs to produce at least 30000 to 40000 world-class engineers. There are at least 50-60 engineering colleges in India whose intake is of the same level as that of IITs; but the institutes are not empowered to transform these bright kids into excellent engineers who can then go to graduate schools in IITs and/or US and complete their PhDs in 3-4 years instead of taking 5 -6 years. And lastly, India has no business to be poor with such bright human resources." COEP is an experiment that it should be possible to replicate and scale up in any part of the country to respond to regional, national and international needs. Each word spoken by him has a huge meaning. His commitment to education at 80 is phenomenal!!

NEW INITIATIVES

As a follow up to the above thoughts, some important things were pursued by COEP with the advice and support of the Board in initial years of its transformation.

1. **A Gap Analysis between a Role Model Institute (IIT Bombay) and COEP**

   This included a detailed study involving faculty of IITs, industry leaders; studying all facets of the institute's functioning starting from the student intake, the curriculum and its delivery, laboratories, library, infrastructure, hostels, equipment, the computer centre, tutorial classes, question papers, the evaluation system, grading practice, the alumni network, industry interaction, work culture, research activities, funding, branding and the like. This helped to identify all the major gaps and a suitable strategy to bridge them evolved.

2. **COEP Faculty Development/Training at IIT**

   The Board firmly believed that theoretically talking about the IIT system at COEP would not be enough to enthuse and motivate its faculty and students and that first-hand experience at an IIT would be of great value. Hence, two important initiatives were undertaken with the support of IIT Bombay.

   a. The first one was to give the faculty of COEP an IIT experience by sending selected faculty members to attend Masters' courses for a full semester, including taking all the tests and examinations. 17 faculty members were sent to IIT Bombay for a full semester to begin with; travelling from Pune to Mumbai on every class day. All of them, not only attended the PG courses, but after taking all the tests, assignments and examinations scored a minimum grade of BB (8 on a scale of 10). The faculty also visited the library, laboratories, met other IIT faculty and gained first-hand IIT-level education. Some of them later went on to do a PhD at IIT Bombay. This has given COEP a rich dividend for the long term - greatly improving coursework and the quality of learning/teaching.

   b. The second initiative was to expose COEP students to an IIT learning experience by having on-line, live 'interactive' classes with IIT Bombay through video-conferencing. COEP placed two video-conferencing units in IIT Bombay, and two other similar units in COEP, and the course content and the timetable of COEP were matched with those of IIT Bombay. 19 such courses were delivered to COEP students, with the same tests, assignments and examinations in the first few years. This gave a feel of an IIT education for COEP students, raising the expectations of COEP students and the COEP faculty members were challenged to come up to their expectations. Thus, a spiral of additional positivity was created. Although this was difficult to accomplish, the cooperation and support of the IIT faculty concerned and the guidance of the COEP Board were very helpful. For every such course, a COEP faculty member would be the coordinator who would also attend these classes. This greatly helped the COEP to revise its curricula on a regular basis, enabling a continuous upgrading of the curricula to the standard of IIT Bombay.

3. **Global Exposure for COEP Faculty/Students**

   Not satisfied with only the IIT exposure as above, COEP requested its alumni in the US to take courses using this mode for COEP students. Some high level courses, such as *nanotechnology, computer graphics, entrepreneurship development* and the like were conducted in this mode often late at night due to the different time zones between India and the USA. So COEP students and faculty were able to have a taste of global education at a low cost. In fact, all of this was launched in 2007 before MOOCs were developed and became widespread. And so, COEP was way ahead of things to come in the country in later years.

4. **COEP Curriculum Revision**

The above experience helped COEP to a large extent and the curriculum of COEP has been upgraded three times during the last 9 years. Thus, COEP curricula are now along the lines of the best institutes in the world. It is interesting to note that COEP was perhaps the first institute in the country to introduce a mandatory Biology course in the UG engineering curriculum way back in 2007 on the lines of MIT in the USA. Now, IITs are planning to introduce a similar course at UG level.

5. **COEP Vision/Mission**

Evolving the vision, mission and goals for the institute as a strategic plan of the institute was undertaken at COEP as a part of gaining its autonomous status. This exercise was carried out with the help of industry experts through a bottoms-up approach involving the students, staff, alumni and all faculty, rather than only the administrative heads. The best modern management practices were invoked by two reputed industry and consultancy organizations to create an ambiance of motivation to do one's best for the sake of the organization by taking up challenges. The feeling that an individual's growth is associated with that of the organization was imbibed through these practices. This has assisted COEP to ensure that the institute's vision, mission and goals are owned by every stakeholder.

6. Industry Linkages

These were developed to such a level that industry was involved not merely in the faculty/staff recruitment process, but in many other areas like, curriculum development, providing examiners, internships, live projects, consultancy assignments, contributing to courses, training staff, sabbaticals, setting up of laboratories, giving awards for the best faculty/ students. Another unique feature has been industry donations to set up state-of-the-art laboratories. As a result, every department now has 2-3 laboratories entirely supported by industry. A few notable examples include Plumbing Association's *Plumbing lab;* Premier's *Vinod Doshi Workshop*, *Robotics lab;* MIT's *Fab lab;* BSNL's *Telephone exchange;* Nvidia's *GPU Lab; IFM lab;* Rockwell's *Automation lab;* Emerson's *Automation and control lab;* Quanser's *Control lab;* IBM's *Cloud computing lab;* Cognizant's *Innovation lab;* Forbes Marshall's *Steam technology lab;* Eaton's *Corrosion lab;* Kirloskar's *Engine lab* and Bajaj's *Mechanical lab*. The development of a *Steam Technology lab* and that of an *Engine lab* had other special features i.e., that these were not mere donations, but provided on-going engagement between faculty, donor industries and students; and the laboratories were developed as a series of UG projects over a 3-4 year period. There are probably few institutes in the country, which have so many industry supported laboratories. It is interesting to note that there are many other industries wishing to donate laboratories, 'waiting in the wings', until additional building space at COEP becomes available. There is another type of major linkage with industry; such as that provided by the Honeywell company, which organizes an event every alternate year at COEP, when a Nobel Laureate is invited to spend three days with the students interacting on cutting-edge research. These initiatives have enabled COEP to reach new heights in academic and research work in recent years.

7. Alumni Engagement

Alumni are a great source of strength for any educational institute. COEP has been able to tap this resource for a variety of activities, a few major ones being: an annual global alumni get-together at COEP and Alumni donations towards scholarships for students, prizes for best performers, setting up of laboratories, faculty awards, techno-booth competition, endowment chairs and the like, in addition to mentoring COEP students. One of the biggest initiatives of the alumni has been the setting up of *Bhau Institute of Innovation Entrepreneurship and Leadership (BIEL)* with funding from four alumni to the tune of more than Rs ten million each. The *BIEL* which has been functioning on the COEP campus since 2010 has plans to house 4-5 start-up companies at a time in the new building which is under construction on the campus, which it is envisaged will be given all kinds of support to succeed. This is, indeed, a

very innovative activity undertaken at COEP in recent years and is somewhat unusual at academic institutions.

8. **Government Support**

This has been vital for COEP. The freedom given by the State Government to COEP to recruit faculty in the post-autonomy years has changed the faculty profile. Faculty strength has grown over these years from a mere 99 in earlier days (at the time of autonomy in 2004) to 205 now, in addition to 9 Professors Emeritus who have joined COEP after their retirement from IITs, or by taking voluntary retirement (VRS) from IITs. There are also a large number of adjunct faculty members from industry who come to COEP to take specialized industry relevant courses. Members of the Board played a key role in establishing the new recruitment arrangements, which have been in place since 2007. The number of faculty with PhD degrees has also increased from a mere 12 at the time of autonomy in 2004 to 107 in 2014. Among the balance of faculty members, 49 are pursuing their PhD research. It is now expected that very soon, 100% of COEP faculty will have PhD degrees. Besides this, the State Government has been generous in granting a special building fund to COEP, which has helped the construction of a state-of-the-art academic complex and an 11-storey female hostel, to meet the long-felt needs. These initiatives have been well appreciated by all the COEP stakeholders.

9. **Academic Ambiance and Research Culture**

Both these areas have seen a sea change at COEP in the post-autonomy period. The main library, to which there was limited access in earlier times, now provides greater open access. The library opening hours have been enhanced from 10 am to 5 pm to the present 8 am to 8 pm with the study room kept open until past midnight on all working days. The laboratories are also kept open for much longer hours every day. The Internet bandwidth has been increased phenomenally from only 2 Mbps in earlier times to 845 Mbps now, in addition to another 1 Gbps from the National Knowledge Network for sharing course content between COEP and IITs. COEP has also been organizing research activities - between US and German Universities and IITs and COEP students - exciting them with challenging research problems. This has enhanced not only PG, but also UG research at COEP.

10. **Faculty/Students Empowerment**

In the post-autonomy period, a large number of COEP faculty have been given full paid study leave to pursue PhD studies from reputed institutes like IITs/IISc, and reduced workload, if pursuing a PhD from Pune University. In addition, faculty development programmes have been arranged regularly in-house and a high percentage of faculty have benefitted from training programmes in IITs/IISc and even abroad. Faculty members are also permitted to present papers in conferences abroad every three years and once a year in India. In addition, faculty receive grants for books and professional society membership fee reimbursement. COEP has also adopted a policy of liberal consultancy rules to encourage faculty to take up consultancy assignments and resource generation for the institute. Faculty members are also encouraged to propose/undertake sponsored research projects to funding agencies.

Towards students' empowerment, COEP has more than 32 clubs ranging from aero-modeling, astronomy, automotive to energy, environment, entrepreneurship to boat club, personal development, science, mathematics, history and philosophy. Each club has been arranging programmes including lectures, talks, seminars and competitions throughout the year to support the development of students' potential as leaders. Life on the campus is always vibrant adding to their all-round personal development. Many awards won by the students in curricular, research and extracurricular activities, nationally and internationally are due to the full freedom that the students enjoy in a highly democratic, open and transparent system. The students can lodge complaints, if any, on the website which are promptly addressed by COEP authorities. There is also provision for getting alumni mentors for the

students through the institute's portal. Students' transcripts are made available to anyone from anywhere through the portal. Students' health records are also created and are available for their own use throughout their lives.

SOME ACHIEVEMENTS

The advice and support received from the COEP Board was of great benefit to the Director, Deputy Director, Deans and the Faculty to embark on the many initiatives above to give a new direction to its work in line with the 21st century expectations of its stakeholders. Major achievements of COEP in the last few years include:

a. Publishing >1600 research papers of which ~ 500 in top peer reviewed international journals, producing more than 50 PhDs and 30 patents in 5 years

b. UG Students developing a pico satellite <1 kg weight for demonstrating a passive stabilization system for the first time in India (to be launched by the National Space Agency in late 2014).

c. COEP students winning in a challenging BAJA-SAE India contest regularly, and the race in world BAJA competition in South Africa making a mark in a global scenario.

d. COEP team also being keenly watched in the Robocon competition every year where best design or best innovation awards have been won.

e. COEP being the only institute, other than IITs, to be part of the national initiative in creating virtual labs and remote triggered labs.

f. COEP is the only institute boasting three Guinness book of world records; skipping on a single rope simultaneously by 192 students fourteen times (displaying strength and team work), 600 meters long painting by 132 students (artistry and creativity) and solving the Rubik cube by 3248 students within half an hour (intellectual).

EPILOGUE

The COEP story continues. The college, which was not even in the top 30 institutes just a decade back, is today reckoned by every other national survey conducted, and is listed within the top 15 institutes. COEP won the second best industry-institute interaction award in 2012 and the best industry-institute interaction award in mechanical engineering in 2013, by a nationwide survey conducted jointly by AICTE and CII.

The story of COEP clearly shows that given an opportunity, through total autonomy, and the freedom to execute its strategic plans by passionate people with the right skills on its governing board to govern it, the opportunity to develop and utilize modern management tools and practices, the institution is now capable of facing the 21st century challenges in technical education. We hope this demonstrates how other Government institutions, keen to excel, can flourish.

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