

Continuing and Distance Education Programmes in Engineering

IGNOU - Industry Partnership

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1.0 Introduction

The unprecedented rate of technology modernisation at work place over the last few decades has offered before the national education system and the industry a challenge, which has to be met quickly and effectively. The new millennium is characterised by an accelerated growth of new knowledge-base and skills, which makes the older ones obsolescent. This renders the older systems of education, training and transfer of skill unable to cope with the fast-changing situation. These views find support from the National Education Policy of India (1986). Faced with the ever-increasing challenges of globalisation, open competitiveness and total quality awareness we cannot allow these to be overlooked and overtaken.

In the field of employment, selection criteria are becoming more oriented towards higher education, higher skill acquisition and both time consuming processes. Mere certificates and grades, unconnected with job-related skill and subject knowledge, are losing their meaning. In most of the developed countries a joint certificate which the craftsmen/technician/engineer has obtained while working (or getting trained) in a industry and simultaneously receiving instruction and evaluation from a competent academic body, is being valued more, than the conventional ones. It is one of the fields where Industry-Institute Interaction (I.I.I.) becomes significant and the synergy between the technical institutions and the industry becomes really productive and meaningful.

1.1 Programme Requirements

The type of institutions which can handle such synergy and variegated activities needs to have a system significantly different from the conventional ones. The main characteristics of such a system would be : (i) Modularity, (ii) Flexibility, (iii) Openness, (iv) Freedom from time constraints, (v) Regular revisability, and (vi) Approachability. By *modularity*, we mean building the whole from parts, each of which is useful and complete in it self. *Flexibility*, relates to the qualifications, age etc. of the participants. *Openness* of the system relates to the freedom of entry into and exit from the system. *Approachability* is the easy accessibility for both, the target groups and resource persons, however remote they may be situated. Of course, *freedom from time constraints*

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has to take care of the fast shrinking half-life period of the knowledge base, so as to allow frequent *revisions and updating* of the instruction material.

It is here that the continuing /distance education mode can play an important role. As variously defined 'as activities, which help people to improve their abilities, skills and competence, professional as well as vocational, thus facilitate entry into advanced specialised areas allowing personal development and satisfaction (UNESCO), it ideally suits the requirement of the Indian industrial worker. If, 'it is a form of education resumed after interval, following the continuous initial education (European Universities' Continuing Education Network)', then considering the fact that the useful knowledge-base of a graduate engineer loses half its usefulness (half-life concept) in about five years, it has to be periodically up-dated by the process of continuing education, at least once in three years and should be made mandatory in most of the organisations.

By their vary nature the C.E.E. programmes cannot be totally carried out at one particular organisation/institution and involves the active participation of several centres of activities to fulfil the purpose, namely :

- (i) *Academic Institutions, especially those involved in Distance Education Schemes, which will form the hub of the scheme;*
- (ii) *Specialised Training Centres where people can get practical training;*
- (iii) *Work site or shop floor where the worker is actually employed;*

Distance education needs to involve the training faculty :

- (i) *Permanent faculty (specialised in continuing or distance education techniques)*
- (ii) *The actual trainer or instructor at the work site/shop floor.*
- (iii) *The instructors in the workshop/laboratory/computer centre.*
- (iv) *Contact resource persons (or guest faculty) to impart specialised lectures/training*

Methods of Training in Distance Mode Involves :

- (a) *Learning resources (in the form of printed materials, audio/video cassettes; CD-ROMS etc.);*
- (b) *Multi-media channels of instruction (including Radio, TV, Tele-Communication and Internet facilities);*
- (c) *Full utilisation of the 'convergence' between communication, information and telecom technologies in order to generate, store, retrieve and distribute the knowle i;ge to the remotest places possible;*

- (d) *Resource sharing with up-to-date information from the most authoritative and reliable sources from any part of the world.*

As an important part of the human resource development of the nation it must receive the active support from all the concerned organisations e.g. the Ministry of Human Resource Development of the State and Central Governments, the Human Resource Development of the concerned industries and business houses, banks and financial institutions. A possible method of financing the scheme may be evolved which can be described as :

- (i) *Outright grants from the MHRD of the Governments ;*
- (ii) *A CEE training contribution from the salary of the workers which may be very nominal (say 0.2% per month),*
- (iii) *Contribution from the participating industries, as a part of their HRD efforts;*
- (iv) *Mobilising resources from builders, donors and international funding agencies.*

1.2 Continuing /Distance Education in Engineering and Technology

With reference to teaching engineering subject, the effort should target the in-service learners e.g. diploma-holders, unskilled workers, etc. Mostly the distance learners e.g. the diploma holders do not get as much time to devote to their studies, as one would desire them to spare. This peculiarity of the people at the receiving end of the chain puts a special responsibility on those who design and prepare the course material. The course material has to encompass the maximum information, which could be assimilated in minimum possible time and space.

The course material has to be field-oriented, with a view to be of maximum benefit to the student. Hence, there is a need for the imaginative course writer as well as editor. Appropriate explanatory diagrams are to be designed or developed, in collaboration with the experienced technical captains of the industry, so as to convey the concepts and basics of a topic in the best possible manner. Incidentally, the state-of-the-art information can very easily and at minimum cost be transmitted in the context of continuing education and extension education programmes.

The electronic media has immense potential. It is an effective tool of learning. It motivates a learner, brings best possible teacher at the doorstep of the learner in shortest possible time. Educational radio and television, computers (Computer Aided Instructions), telephone, teleconference, etc. are proving to be very effective tools.

Telecasting well prepared programme laboratory experiments and, live examples from the field present us with an opportunity to convey and clarify ideas. All these

efforts will not only benefit our learner but also the students of conventional system of education where they get meagre opportunities to visit industrial sites and hands on work.

With particular reference to Continuing Engineering Education, it would be welcomed if, well thought-out short documentaries are telecast to bring out the vital and basic points that may or may not have been included in the course material. These and similar other efforts are bound to impact upon the target audience, and in return yield dividends in the shape of updated and well-informed technical personnel.

While dealing with competency and skill development, there is a need of uniform and standard syllabus, certification and testing procedures. For example, in the field of building construction such certification can be in the areas of Electrical Wiring, Masonry, Carpentry, Plumbing, Refrigeration and Air Conditioning to name a few.

1.3 HRD Needs in Construction Industry

Construction industry is one of the biggest components of India's national economy accounting for about 50% of the national expenditure. Construction workers of all categories including skilled or unskilled workers, supervisory staff and technical specialists are estimated at about 25 millions at present, comprising 4% of the total work force as shown in Figure 1.

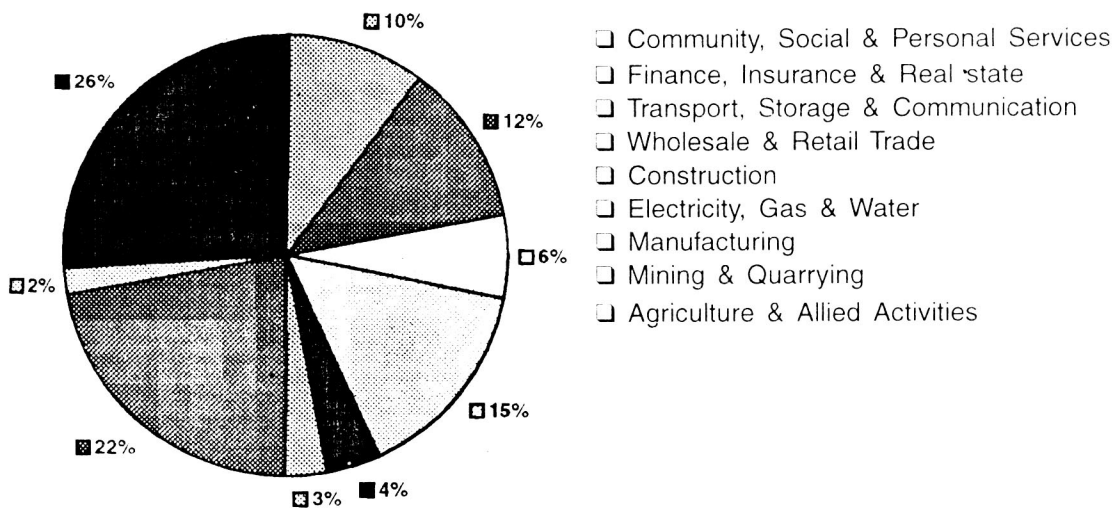


Figure 1 : Share of GDP by Economic Activities for the Year 1998-99

Construction industry is one of the fastest growing sectors in our economy as can be seen from Figure 2, which shows projected employment in this sector from a trend chart (1995-96 to 2004-05).

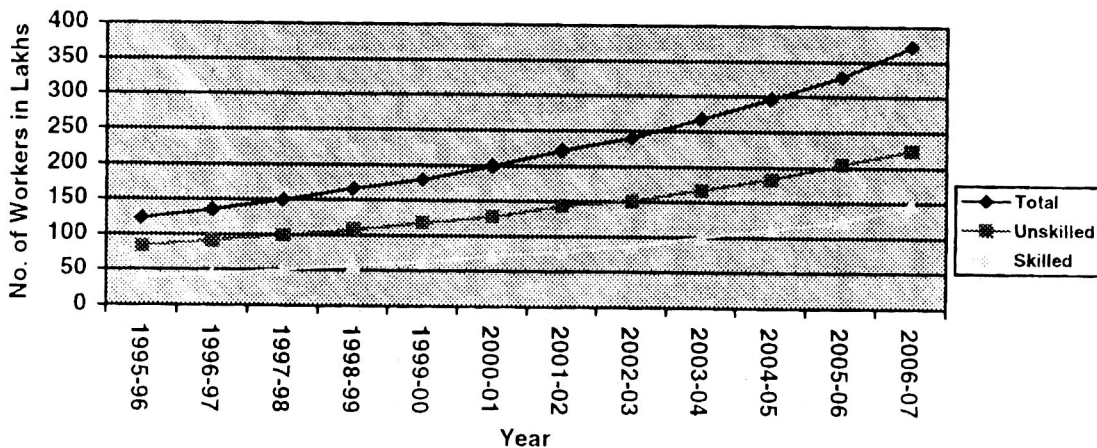


Figure 2: Projected Employment in Construction

From the 200 firms in the corporate sector, 90,000 class I contractors and 600,000 smaller contractors, the sector employed 14.6 million men in 1995-96, which is expected to rise to 32.6 million by 2004-2005.

However, training occupies a very low priority in the sector. Even the capacity utilisation of ITI's as per Table 1: shows that seat utilisation is much lower than their capacity, indicating little demand for such formal training both by the work force as well as their employers (the contractors). Only 19000 admission were made against a total capacity of 29000 leaving about one-third of the seats vacant.

Table 1: Capacity Utilisation of ITI's, 1996

Trade	Seating Capacity in 1996	Seats Utilised
Plumber	1793	1071
Mason (Building Construction)	308	159
Carpenter	3315	1899
Painter (General)	1120	684
Electrician	19659	14039
Draughtsman (Civil)	2720	1772
Surveyor	281	124

This shows that at this level of craftsmen/workers (carpenters, masons, surveyors, plumbers etc.) more than three-fourths of the persons acquire their skill from family sources or privately from other skilled workers. Besides the estimated demand

for manpower of various categories in the construction sector is shown in the pie chart (Figure 3).

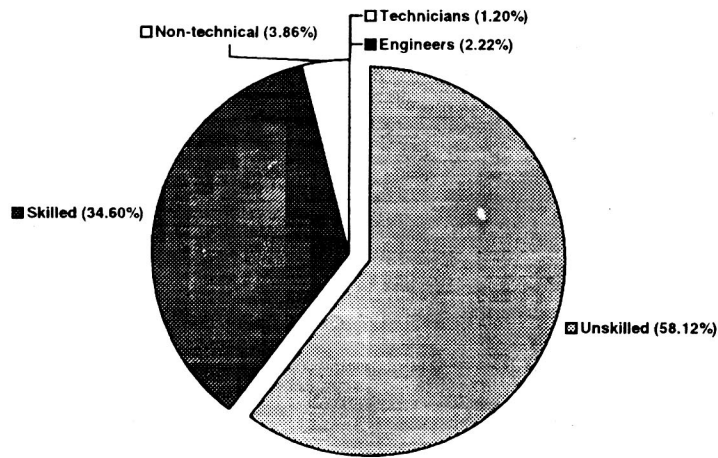


Figure 3: Estimated Demand for Construction Manpower for the Year 2001

Figure 3 further records that about 58% of the total manpower are unskilled workers, half of them may be semi-literates or illiterates, for whom no training facilities exist, except acquisition of skill from other skilled workers or family members. Besides, the 2.22% engineers and 1.20% technicians very few institutions provide facilities for continuing education; and as most of them are formal in nature and require 'in-house' study requirements, that makes it difficult in actual implementation.

In construction industry alone the scope of such an effort covers areas from construction planning, construction techniques, site management and operation to maintenance and repair of buildings. Informed estimates put the requirement in our country at about 5000 professionals to be catered for per year. Whatever some professional corporate bodies do in this regard namely training their own in-house professionals, is obviously not the whole answer to this problem. Hence, current and innovative methods, and effective delivery systems are called for, so that the process is ever responsive to the diverse needs.

The SWOT analysis of the construction industry reveals :

- (i) *A large market, large and cheap manpower, entrepreneurship (Strength);*
- (ii) *Large - scale illiterate/semi-literate workforce in unorganised sector depending on primitive practices & thumb rules; qualified professionals demoralised due to low remuneration, job classification and no future*

prospects for promotion, etc. (Weakness);

- (iii) High potential for export of qualified and skilled manpower, software and building components (Opportunities);*
- (iv) Challenges posed by globalisation/liberalisation; and adoption of mechanisation and pre-fabrication techniques in building construction (Threats).*

For proper exploitation of the 'strengths' and 'opportunities' we must overcome the 'weaknesses' and cope with the impending 'threats'. Another study by National Institute of Construction Management and Research, New Delhi shows that most workers acquire their skill by informal training from skilled workers. (About 74%), or from family members (10%). Whereas, training institutes with or without recognised diploma forms less than 4% of such source. On-the-job training is provided in only 7% cases. Hence, on the job training and certification becomes a very important task for the industry. And it is here that they can take recourse to the distant mode of education owing to its flexible requirements.

1.4 Degree/Diplomas Programmes of IGNOU

Aiming at "employment related education for economic benefit to learners", the IGNOU initiated two years' Advanced Diploma Courses in Construction Management (ADCM) and Water Resources Engineering (ADWRE). The Courses are aimed for 3 years' diploma holders in Civil Engineering, with a work experience of 2 years and who are employed at work-sites where they could have received their practical training. Special Study Centres were identified for their counselling and Laboratory work. Those who have completed the Advanced Diploma could opt for a further 2 years (minimum) of study to get a B. Tech. Degree in the above specialisation's. The syllabi of the above 4 years' course is so framed that a candidate can exit after the second year with an 'Advanced Diploma', and finally after full four years with a B. Tech. (Civil Engg.) degree.

1.5 IGNOU Industry Interaction

Through its Continuing & Extension Education Cell (CEEC), the S.O.E.T. (IGNOU) has launched its Open Learning and Distance Education System (OLDES) which are flexible and modular programmes for in-service training, further and functional education and upgradation needs of sub-professionals and which is direct interest to industry/employer groups. The arrangement of these collaborative continuing education projects the total academic responsibility, including that of examination & certification, will be of IGNOU, while the in-plant/on-site continuing education programme delivery will be the responsibility of the participating industries.

CEEC (SOET) also extends its OLDES System to implement its “Extension Education Industry Competency based Vocational Qualification Programmes” (ISCVQ) for trade level and supervisory development level skill certification of those at work. It is implemented in partnership with industries by resources networking with work-place based training channels, industry training divisions, distance learning institutes, training institutes, formal and informal systems of training etc.

1.5.1 Continuing Engineering Education for Construction Workers

IGNOU's academic programmes and courses, in content as well as in structure, as also in their design and delivery, seek to address the varying needs of a vastly heterogeneous body of learners. The mix of its programmes reflects the concerns of contemporary development. From the education of professional managers to primary and secondary school teachers, from computer professionals to construction workers, from medical and health personnel to Panchayat members and NGO activist, IGNOU is endeavouring to reach out to all sections of our people and in all part of our country.

In the field of Engineering and Technology, we have launched B. Tech. Degree programmes in the areas of Construction Management and Water Resources Engineering. The employed polytechnic diploma holders are eligible for admission. The learners are also given an intermediate option to earn an Advanced Diploma.

In addition, IGNOU in association with Construction Industry Development Council (CIDC), Builders Association of India, and industrial houses such as L&T, NBCC, Simplex Concrete Piles, etc.; has also launched a certification programme [Construction Workers Vocational Qualification (CVWQ)] targeted to upgrade and certify the skill of construction workers and supervisors.

1.5.2 Continuing Engineering Education for Tannery Workers

Towards this, IGNOU and Central Leather Research Institute (CLRI) Chennai initiated Tannery Workers' Vocational Qualification Project (TWVQP) in January 1996 about certifying skill and supervisory competencies of tannery workers. In the first phase the TWVQ Project dealt with sub-functional area of ‘Beam House Operations’ and identified the following trade level training :

1. *Beam House Worker (Soak Yard, Unhairing, Limeyard and Drum Yard Workers).*
2. *Beam House Machine Operator (Flesher, Scudder & Lime Splitter).*
3. *Beam House Supervisor (Soak Yard, Lime Yard, Machine Yard and Drum Yard Supervisors).*

Under the above head 11 certificates have been offered through six tannery associations. From January '96 - May '98, IGNOU and CLRI implemented the first

phase of the TWVQ Project during which Beam House Competency Instruction comprising 23 blocks (books) was first developed in English, and then in Tamil comprising another 23 blocks (books) in print and a set of 63 audio cassettes. The Beam House Competency Instruction in Audio Cassettes in Tamil was developed basically to reach learner target group of tannery workers who are only functionally literate.

Under TWVQ Project Phase-II which was implemented from July 1998 - March 1999, the Beam House Competency Programmes at Trades and Supervisory Levels were implemented on Pilot basis at Erode, Dindigul, Trichi and Chennai Centres. From the initial response of 109 candidates, 66 candidates at above centres underwent the Skill Training for different Beam House Competencies, and in all a total of 65 candidates cleared their respective programmes successfully.

It may be mentioned that TWVQ Project was designed, developed and implemented by CLRI and IGNOU in participation with Tannery Associations and Tanneries. As a result the entire competency programme pedagogy has emerged to be learner need-based and employer-friendly.

The construction industry has identified certain areas and is also in the process of identifying additional areas in which the construction professionals, supporting sub-professionals and construction workers need to be trained and updated.

The C.L.R.I., Chennai has also identified eight major areas under the L.T.M. project for : (i) Resource Augmentation, (ii) Technology Upgradation, and (iii) Human Resource Development.

1.6 Future Prespective

The industry has to play in enriching the content of the learning material to be developed. They can do it by sharing its manpower, sites their workshops, technology, sponsoring its workforce, and of course by financing such pious efforts.

In doing so they are going to reap a truly rich harvest. Construction industry in India has a vast network over the length and breadth of the country. It is at their centres that their future hands can not only pick up the nuances of construction practice, but also learn at first hand the techniques that no text material can teach fully through the written word alone. Therefore, the industry has to come forward in a big way to fulfil this dream. In the bargain, the industry shall be training its manpower and perhaps this effort may address to the usual complaint of practising engineers about the young graduates from traditional technical institutions.

Availability of the Internet connectivity has added a new dimension to distance education. This has many purposeful things to offer to us such. Expansion of teaching and research; and the interaction amongst the learners, industry, sponsors, and

institutions are the fast rising stars of progress above the horizon of human civilisation. With this, the dream of continuing professional development benefiting a vast number of people seems to be an absolute certainty.

Possibilities are immense and these await being transformed into opportunities. Hence, the buzzwords have to be planning, co-operation, and action.

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