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Paradigm Shift of Science and Technical Education through Open and Distance Education Mode

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Abstract – Education is an important instrument for social and economic change and an investment for better future. It is a lifelong process. It should cater to the needs of those who need to further knowledge and skills for various reasons. Distance Education is an innovative and flexible system for imparting education to varied target groups at different stages. At present, the youth and women are enrolling in higher number into Distance mode.

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INTRODUCTION

The present enrolment in various Distance Education Institutions and Open Universities gives the clear idea that shortly the age old formal education system will be replaced by Distance mode. Already many conventional Universities started the Distance mode. But these institutions are continuing to function in conventional mode. Hence the students of distance mode are facing many issues which form the causes for their dropping from education.

With rapid change in global and national scenario specially due to manifold increase in population, fast development in science and technology, industrialization, modernization, urbanization and liberalisation in all aspects of life, the number of needy ones for science and technical education has grown manifold beyond expectation-unable to be catered by regular educational institutions, importance and role of distance modes in the field of technical education as well as higher education in science has become a must. In this paper author has made attempts as to how science and technical education in India through distance learning mode can be made successful and effective inspite of so many inbuilt constraints and apathetic attitude of the conservatives available everywhere in the various government organisations/ agencies and in the general society so as to have complete acceptability, economically viable feasible and manageable for one and all for science and technical education through distance mode.

NEW WAVE OF EDUCATION AND TECHNOLOGY

A few decades earlier, there were very few educational institutions for imparting education in science and a very few in the technical education. Also there were limited number of students opting for science education. Out of these only very few in the technical education. Also there were limited number of students opting for science education. Out of these only very few used to opt for technical education and the rest were opting for higher education in the science itself. Based on demand and supply principle for science and technical education through regular educational institutions everything was all right. Everyone was satisfied. Those who wanted to have, were having desired educations very easily.

During late 1980s and early 1990s, situations and time started changing. All of a sudden due to change in policies of the Government, in India and elsewhere in the world, cumulative effects of continuous population increase, industrialization, automisation, urbanisation and rapid changes in science and technology development, liberalisation in all aspects of life and easy accessibility to various information's, there is rapid attitudinal change in society. With vas employment opportunities in India and abroad in science and technological areas irrespective of government of private sector, most of the people in general society started opting for science and technical education in particular. This resulted into opening of a large number of educational institutions catering to the need of aspirants in science as well as technical education. Even then a very large percentage of people are

devoid of getting education in the desired science and technical streams. Still there are many who are not having higher education either in science or technical stream due to economic problems or due to opting for earning by way of joining either service or business and hence due to paucity of time but who want to pursue education in the science stream or in the engineering stream so as to have better future and better opportunity in later years. In this context, this paper will deal further for necessity of distance education, present conditions, problems being faced and remedies to have science and engineering education through distance education mode to the possible extent with desired quality and standard.

NECESSITY

In the present era, when number of aspirants seeking higher education in science and pursuing technical education is very large and it is not possible to admit them in regular educational institutions, imparting education by distance education will be a boon to the aspirants. Necessity of distance education in engineering and science field is a must due to following reasons:

- Aspirants who are on job or in business want to pursue science or technical courses as per their interest.
- Those who don't want to attend regular classes and want to study on their own.
- Those who don't have time to attend regular classes.
- Those who have to earn their livelihood for their family but want to get higher education.
- Those who cann't get admitted to regular course due to less number of seats available and hence due to tough competition in their place or at other places.
- Those who don't want to shift from their place and unable to get admitted in regular courses but have desire to pursue higher education.
- Those who want to pursue engg. or science education but engineering college or science college is not available in their place and simultaneously they don't want to leave the place.
- Those who cann't afford higher fees of regular courses.
- Those who cann't afford higher fees towards hostels and day to-day maintenance expenditure.
- Those who want to have education at any point of their age and at any point of time.
- Those who are not allowed to move out of their houses due to one reason or the other on frequent basis but still want to pursue education.

Similarly there may be other reasons also due to which science and technical education through distance education mode is necessary and beneficial to the aspirants.

PRESENT SCENARIO

Though distance education in different fields of education viz. in most of the Arts faculty and Commerce faculty at different levels of classes viz, matriculation, intermediate, graduate and post/graduate levels is available for the last 30-40 years through various Institutions of Correspondence Courses under various Universities, educational planners and administrators had not thought to have education in science or engineering through distance mode are various levels. Now, IIT^{s} and IIM^{s} started on-line programmes for various disciplines

SCIENCE EDUCATION

Till now among Universities which are involved in distance education programmes as per our knowledge and information's from various sources viz. directories, advertisements in the newspapers, journals and other media only very very few Universities are having various courses in science stream at different levels eg. Madurai Kamaraj University, Annamalai University and Madras University conduct science course at P.G level viz. M.Sc. in Physics, M.Sc. in Chemistry, M.Sc. in Botany and M.Sc., in Zoology. One or two more Universities have also though to start these courses. Even Madras University is not running above courses regularly and properly. Dr. B. R. Ambedkar University, Hyderabad is running courses in science at Graduate level and some other at Intermediate level and also many Universities are and running courses of M.A /M.Sc, in Mathematics.

People are not satisfied with M.Sc courses of these Universities. As per wish and will of the University, courses are being conducted. What so ever time table for calender of academic events and examinations they are promising, are not being followed in actual sense. Students have to write letters after letters and reminders after reminders to the Directorate of Correspondence Courses. Most of the time, these are related with admission, supply of study materials, for calendar of events, contact programmes schedule and centre for completing practical courses, schedule, timing and centres for examination, results, despatch of marks sheets, original certificates, migration certificates etc., These complaints are very large in number. No one is there

to look after all these. Even if there is Grievance Cell, that is just for name sake. Personnel working at the institutions/Universities are not bothered at all . Writing letters and sending reminders/complaints have no effect at all. Many times out of disgust, many students think it is better to leave the courses in middle of the course itself than to suffer mentally, psychologically and economically for the whole session. Some of them have patience and they continue even against all odds.

Here again students who struggle hard don't get desired results when they get marks card they feel too much disgusted with prevailing conditions in the University. It is to their dismay that answer papers are not evaluate properly, marks in the theory subjects will be awarded as per whims and fancies of the examiners or the persons involved in the examination work. Similarly in practical examinations some marks will be put. Nobody bothers about the answer paper either for theory or for practical's. Even better students have to pacify themselves with average or below average marks awarded without any basis. Students are in dilemma as to whom to approach for all these rots and malpractices in the institutions.

Even if one is able to approach Director or senior persons, his her problems are not solved. In most of the cases personnel working in the institutions are lethargic, careless and not work oriented. They neither are not ready to listen even to their higher officials. No good systems are existing to have distance education in proper ways and in time with least cost and of desired quality.

Inspite of all problems there is huge rush for admission to these science courses at various levels because there is no other go. Candidates at large are unable 'to get admission in nearby regular institutions or else at other regular institutions also due to reasons mentioned above. If one wants to purse science courses in distance mode, one should be ready to face all these problems or else one should forget to undergo science courses. This is the real existing scenario as far as science education through distance education being conducted by Institutions of correspondence courses is concerned.

TECHNICAL EDUCATION

As far as question of technical education being imparted through distance mode is concerned, result is decimal. To our knowledge till now very few Government universities and many Demanded Universities are running B.E level or M.E. level or Ph.D. level courses in engineering/technology. B.E. level courses may be in Civil Engineering, Mechanical Engineering; Industrial Engineering, Production Engineering, Auto-mobile engineering, Electronics & Communication engineering, Instrumentation Technology, Chemical Engineering, Electrical Engineering, Computer Engineering, Agriculture Engineering, Textile Engineering and Architecture etc. Similarly M.E. level courses may be for various specializations under each engineering discipline e.g. under civil engineering, it may be Water Resources Engineering/Management, Geotechnical Engineering, Environmental Engineering, Transportation Engineering, Structural Engineering etc.

As per information's available with us only Indira Gandhi National Open University is providing some technical courses such as Post Diploma in Construction Engineering and Post Diploma in Water Resources Engineering. But all can't take admission to these two courses. Minimum criteria to take admission to these is that one must possess Diploma in Engineering from Polytechnics. Annamalai University and some others like NICMAR (National Institute of Construction Management and Research), Delhi Productivity Council etc. are running one or two courses in Construction Management. There is no facility available with any University to pursue B.E. or M.E. courses in various disciplines through distance mode.

Of course in the areas of technical education, there are facilities to do some courses equivalent to B.E. or M.E. level in some of the disciplines. Biggest institution of such type is the Institution of Engineers (India) which admits students under studentship category which is given to candidate subject to full-filling of certain conditions such as one must be passed in Intermediate Science or Diploma in Engineering and also one should be working in engineering organisations. Here examinations are conducted twice a year. Students are required to clear a specified number of subjects /papers to get degree like AMIE here no course materials are supplied to students. Everything is left to the candidate. Role of Institution of Engineers is negligible. There is no provision of study materials, contact programmes, arrangement for theory and practical classes, question and answer session, assignment and other features of distance education. This may not be called even courses through External Registration also. Students have to prepare for the examination on their own. Here only those candidates who are actually working in engineering related organisation can pursue such courses. Of course, this course is also equivalent to B.E. by State Governments. Similar institutions on similar pattern are Institution of Mechanical Engineers, Indian Institution of Industrial Engineering, Indian Institute of Aeronautical Society, Computer Society of India, Department of Electronics (Government of India) and Institute of Town Planners etc.

Then M.E. courses in various engineering disciplines through external registration scheme by Research are available at various reputed institutes such as Indian Institute of Science, few Regional Engineering Colleges, a few Indian Institutes of

Technology, BITS (Birla Institute of Technology & Science) etc. Here all cannot be admitted due to certain terms and conditions. Candidates should have specified years of experience and should be working in a particular type of organisation. Here candidates have to stay for a minimum period at the institute and have to pass all papers and they are also required to work under suitable guides. Here actually technical education through distance mode at various levels is not available by any technical institute or by University specially for B.E. & M.E. courses.

FUTURE SCENARIO

Under existing circumstances based on facts and figures, the Government of India, State Governments, Universities, Department of Science & Technology, Directorate of Technical Education, Centres of Distance Education, Autonomous. and private science and technical institutes and other responsible organisations including professionals of related areas, educational planners and administrators who are keenly interested in all facets of distance education programme for Science and Engineering disciplines must sit together, think seriously through seminars, conferences*, meetings of various committee constituted for the purpose and come out with tailor made solutions which must be economically viable, practically feasible and socially acceptable to and by all.

Future of science and technical education through distance mode is very bright and day by day there will be more and more demand. To have proper and systematic education in science and .engineering streams in distance mode to be made available to all needy. The following suggestions may be worth-while to be implemented:

- At national level itself National Open Science University and National Open Technical University - One headquartered in South India and the other in North/East India with zonal and sub-zonal offices in all States are required to be set up.
- Both the above National Open Universities should be manned by personnel related with respective areas. These personnel should be dedicated, duty bound, work oriented and honest to their duties and responsibilities.
- Full proof system must be followed for admission, supply of course material, contact programme, conducting practical training, conducting theory and practical examinations, assignment, issue of all types of certificates, course/ curriculum development, training and placement, administration and fixed standard time tested calendar of events for all activities.
- For science stream, courses should be run for all combinations at all levels viz. Intermediate, Graduate and Post-Graduate levels. Proper combinations of various science subjects like Physics, Chemistry, Mathematics, Botany, Zoology, Computer Science, Electronics etc. should be thought of. Similarly for technical education, all types of engineering disciplines viz., Civil Engineering, Mechanical Engineering, Industrial Engineering, Automobile Engineering, Production Engineering, Chemical Engineering,. Electronics and Communication Engineering, Computer Engineering, Agricultural Engineering, Textile Engineering, Environmental Engineering etc. at Diploma level, at B.E. level and at M.E. level must be provided.
- Duration of Diploma course with entry of Matriculates is to be of 4 years, for B.E. with entry of Intermediate or Diploma is to be of 5 years and for M.E. with entry of B.E. should be of 2 years duration.
- For each course, maximum duration to complete the course should be limited to twice the minimum duration of that particular level course.
- For each course, fee should be reasonable, viable and feasible to take care of University's expenditure and people's capacity to pay.
- For admission and all other activities from time to time proper advertisements through all media with sufficient time gap should be given.
- University should develop proper course curriculum for each discipline based on present need, changing scenario and development in the related areas to have proper market value everywhere.
- For theory subjects there should be provision of contact classes for 15 days to 30 days in a year to give exposure on the curriculum. Similarly for practical subjects, students must attend contact programme for 30 days per year in the nearby college having all facilities available preferably during vacations. Candidates should be provided hostel facilities at cheaper affordable cost.
- Properly well prepared better study materials based on need, syllabus, examinations etc. should be supplied to students as per programme schedule without any delay.
- Through all possible modern educational gadgets, teaching through distance mode

should be provided to students at their place, if possible.

- To have complete interactions, time to time sending assignments to the students and submission of answers for assignments, proper and timely valuation of answers and return of assignment answers with model answers must be taken care of.

- Students should not face any problem due to the fault of University personnel. However fully active grievance cell must take care of students' problems to solve immediately by all possible means.

These are few steps and similarly many suitable steps should be thought of and taken up to make all courses successful through distance education programme. Here all steps have to be taken up such that distance education programmes in science and engineering, streams must not be inferior in any aspect in comparison to regular courses.

CONCLUSION

Under present changing scenario, to provide science and technical education to all needy ones in ever-increasing numbers regular educational institutes being very less in number are not able to cope with ever-rising demand. Only through distance mode, all can get education in science and engineering streams at all levels for which proper steps with separate National Open University must be taken up to have the best education in future in time within reasonable cost with desired quality of education.

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