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Educational Technology

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INTRODUCTION

In disseminating ideas relating to Educational Technology and in helping it to gain national attention, NCERT's name comes in the vanguard. In the 40s and the 50s, words like "teaching aids" or "audio-visual aids" had a definitive meaning in India. But in the 50s, with B.F. Skinner's untiring efforts in the USA the concept of 'programmed instruction' an instructional technology travelled across the seven seas and touched the shores of India.

In 1965 the NCERT organised a national seminar to popularise programmed instruction, and later on undertook scores of programmes to clarify and disseminate various concepts related to instructional technology. Soon many institutions throughout India started buzzing with activities relating to programmed instruction.

In 1973, the NCERT, UNESCO and UNDP entered into a tripartite agreement to launch INSAT for Education. This was the first official declaration to launch the "Education Technology Project" in a coordinated way with the help of the Central and State governments and international agencies. Under this project a new institution, 'Centre for Educational Technology' (CET), was set up in the NCERT. In the Ministry of Education, Government of India, New Delhi, a coordination unit was set up.

If 1973 was the year when preparations for producing educational television programmes and launching of ET projects began under the SITE, 1983 was the year when a momentous decision was taken to give the responsibility of producing television programmes to educational institutions. Consequently, CERT was raised to CIET by the merging of DTA and CET in 1984. Six State Institutes of Education Technology (SIETs) were set up, one each in the states of Bihar, Orissa, Maharashtra, Gujarat, Andhra Pradesh and Uttar Pradesh. The Education Technology Cells existing in other states were also strengthened.

Again, in the Seventh Five Year Plan, new schemes of Educational Technology were launched in the states by the Centre. These schemes covered supply of TV sets, supply of two-in-one radio-cum-audio players.

Researchers know that in India, unlike in the USA, where the term 'instructional technology' was largely used, the term used, the educational technology. Further, researchers would find it also interesting to note that the NCERT, university departments of education and teachers' colleges, used the word 'educational technology' as a synonym to technology of education, i.e., they emphasised the behavioural aspects of educational technology, by bringing to the forefront the process and the software production aspects. The second meaning of educational technology, i.e., technology in education, i.e., the hardware concept was largely shared by Doordarshan, the Ministry of Human Resource Development and the state governments where the emphasis was on providing reception equipment (radio

and television) to a large number of institutions and to popularise educational television and radio inputs to support classroom teaching. In the author's view the third meaning of educational technology, i.e., the systems concept to tackle educational problems, was and is perceived by a few isolated individuals.

The teachers' colleges, university departments of education and the NCERT have kept the show running on the process aspect of educational technology.

The National Educational Policy (1986) has highlighted the role of educational technology. The Programme of Action (1992) is another document which lists strategies to be adopted by the Central and state governments to promote activities relating to educational technology.

The potential of modern communication technologies has a direct bearing on the education system. Thoughtfully and judiciously used, communication technologies can massively extend educational opportunities and improve the quality of education. At the school level CIET and six SIETs produce ET programmes for the primary school students and teachers.

At the university level the UGC has created 14 EMRCs, AVRCs and MCRC to achieve a level of 80% capability for indigenously produced programmes. The UGC has also set up Inter-University Consortium for Educational Communication (CEC) to provide coordination and leadership to EMRCs, AVRCs and MCRC, and to develop a forum for bringing government, universities and professionals together to organise efficient marketing.

Further, under the E.T. project the Government of India has distributed 2.5 lakh radio-cum-cassette players and 40,000 colour TVs to schools.

When massive efforts are being made to provide E.T. inputs both at the school and the university level, it is advisable to take stock of views on the role of E.T. all the world over.

A.W. Bates, who has devoted his life to educational technology both in UK and Canada, is of the view that all good media programmes promote learning but their impact becomes significant if they are used in a judicious mix. There is also another point of view which has negative overtones—'educational technology has been overrated, over-sold and has been under-productive'. We will have to wait to see what Indian researchers say about the effectiveness of E.T. But we already do have some observations on the functioning of organisations related to E.T.

On the working of SIET's, the P.O.A. (p. 187) has observed that "their output is still sub-optional". It has also observed "there is a need to improve the quality of the programmes."

The E.T. facilities in the country are underutilised and quality of programmes produced is substandard. Only imaginative steps at the managerial and planning levels can remedy the ills.

So far as E.T. is concerned, one can see research maladies at three levels : (a) there are extremely few sponsored researches; (b) there is a lack of coordination in research activities; and this lack is visible on the whole as well as on researches taken up by a single institution also; (c) there is a disproportionate tilt towards embracing one format only. Let me elaborate.

Under the researches reported for review there are only a few which are sponsored researches. This is a gap palpably visible. Even if we look at the sponsored researches they stand alone in isolated heads. The composite pattern of a garland is missing.

The second weakness is lack of coordination. The third gap is in regard to research design.

REVIEW OF RESEARCHES

In the present set of studies provided for review, there are 76 studies reported during 1988-92 which may be classified under the

following categories :

— Researches relating to Video
   and ETV Programmes   22

— Researches relating to Radio
   and Audio Programmes   07

— Researches relating to Micro
   Teaching and Strategies   23

— Researches relating to CAI, PSI
   and Mastery Learning   07

— Researches relating to Programmes
   Learning/E.T., Teaching Aids
   and Film strips   13

— Educational News reporting   04
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Video and ETV Programmes

Out of the 76 studies under ET, 22 studies relate to Video and Educational TV Programmes.

Abrol, U. et al. (1991) conducted a study on TV viewing among children of Delhi schools. The study was based on a sample of 750 students drawn from 44 primary and secondary government schools. The findings reveal that the majority of the mothers were restrictive to their children's TV viewing, and no significant difference was found in the amount of TV viewing by male and female children. Viewing was independent of IQ of viewers and it was heavy on Saturdays and Sundays.

Antonysamy, L.'s (1989) study relates to teaching environmental concepts to school drop-outs through video and charts. It was found that learning through viewing of the video films was more effective than learning through charts.

Anuradha, K.'s study (1991) related to children's television viewing behaviour and its impact on personal and educational development. The study also showed that children like watching advertisements and programmes on sports.

Arularam, I. (1990) took up evaluation of

the UGC programmes popularly known as Country-wide Classroom Education TV programmes. The study revealed that most of the programmes cater to urban audiences. The needs of the rural students still remain unfulfilled. The study also revealed that programmes in humanities were poor in offering knowledge enrichment.

Behera, S.C.'s study (1990) investigated the impact of ETV on competencies of teachers of elementary schools. The study demonstrated that teachers exposed to ETV programmes achieved significantly more on their knowledge, understanding and application in the specified content areas. In actual classroom interaction, ETV teachers significantly differed from Non-ETV teachers on Teacher Response Ratio, Teacher Question Ratio, and Pupil Initiation Ratio. Teachers also pointed out power failures, mechanical disorders and unsuitable time slot as some of the vulnerable problems.

Biswal, B. (1992) contributed a paper outlining the research priorities of educational telecasts. He has rightly visualised the need for training of educational administration, programme producers, teachers and researchers. He also suggested the need to conduct collaborative researches which would have teams of teachers, researchers and producers.

Chaudhary, S. (1990) conducted a study on teachers' attitude towards school TV (STV) and its relation with job satisfaction. He found that job satisfaction was associated with the authority responsible. For work allocation, intensive case studies revealed that the majority of teachers did not operate STV regularly and the majority of TV sets were out of order. Teachers perceived STV as a good tool for teaching and were fairly satisfied with their job. Teachers teaching Classes IV and V showed a more positive attitude towards STV than teachers teaching Classes I-IV.

Giri, A.P. (1990) investigated the problems and prospects of school radio broadcast programmes. He found that utilisation of radio broadcasts was more in urban schools than in

rural ones. Further, in the rural sector only 1/4th of the schools had the provision of a separate period in the time- table.

Ghosh, S. (1992) looked into the ETV reporting in Tamil Nadu. The survey goes beyond education and covers programmes on health, agriculture and adult education. It was found that although time-duration of the programmes was generous, the telecast did not come at a convenient hour with the result that the targeted audience had to miss the programmes.

A conspicuous neglect was pointed out in the training of teachers, both in writing radio scripts and in utilising school broadcasts. All teachers agreed that school broadcasts were useful and helpful to students.

Idayavani, S. (1991) developed two video programmes, one on weathering and another on rivers, and made a study to see how viewing of the video programmes affect their achievements. It was found that students who were exposed to the video method performed better than students taught by the traditional lecture method.

Jaiswal, K. (1992) took up a study on the effectiveness of TV programmes in science education. The study was conducted on B.Ed. Diploma in Computer Education students. Lecture with demonstration and illustration talk formats were found quite effective. About 70% of the programmes focused on the lower cognitive skills of knowledge and understanding. About 3/4 of students were satisfied with the quality of the programmes in terms of language used, technical quality, additional information and synchronisation and compatibility of sound with visuals.

Joshi, V. (1987) worked on the effectiveness of secondary school TV programmes in science. The researcher found that school TV programmes are run of the mill and have not changed over the years. The study also revealed that the programmes were of poor quality, and no significant difference was found in scholastic achievement and the scientific attitudes of students exposed to STV programmes.

Kalimuthu, T. (1991) developed a video programme on environmental pollution and compared students' performance receiving instruction through video-viewing and through traditional teaching. The experimental group receiving instruction through the video programme gained more and learnt more concepts as compared to students of the control group.

Kapadia, A.M.'s Ph.D work (1992) related to the impact of TV on student learning. In contrast to Joshi, V.'s (1987), the study reported that the TV group gained significantly more than the controlled group. Even retention scores of the experimental group were better. Seventy per cent of the students opined that TV programmes help them in self-learning.

Education Technology Cell, Meghalaya (1988) conducted a survey of the ETV programmes in the State. The organisation interviewed 289 headmasters, 538 teachers, 774 parents and 1,240 students. The survey revealed that students wanted longer duration ETV programmes and with the frequency of one programme a day. Power supply and problems relating to maintenance and repair were blocks to popularising ETV programmes.

Mishra, S. (1991c) studied the role of TV in diffusion of Home Making Practices (MHP) among urban housewives of Bhubaneswar. The study revealed that TV programmes made little contribution to housewives in their efforts to adopt Home Making Practices.

Mohanty, P.C. (1988) took up a study of the ETV programme for primary school children and found that children exposed to ETV programmes had superior scholastic attainment as compared to children of the non-exposed group. The greatest achievement was in respect of "language".

Narayanasamy, M (1991) prepared a video programme for sixth grade students to teach Tamil vocabulary. He found that the experimental group learnt more Tamil words using the programme than the control group.

Phutela, R.L.'s (1991) studies on the effects

of comic and comic TV serials on children and found that the younger children liked stories related to horror, animals, fools and silly dolts. Children preferred detective, comics/serials followed by mythological and folk tales. Most teachers felt that comics help in a language and aesthetic development.

It is interesting to note that none of the teachers or parents supported the view that comics develop criminal tendencies.

Pillay, G.S. and Anandan, K. (1990) made an analysis of the educational video programmes produced in India at the higher educational level. The survey revealed that very few video programmes were produced in subjects like law, anthropology and veterinary sciences. In general, educational subjects like economics, sociology, management, education received greater attention but not geography or political science. The researchers felt that there was no coordination between various production agencies.

Sinnathambi, V. (1991) developed a video programme on Energetics in Chemistry for higher secondary students and found that the experimental group learnt more concepts and gained more on the achievement test in Energetics.

Sudame, G.R. and Goel, D.R. (1988) made a study of school broadcasts in Baroda district. The study presents a happy state of affairs. However, it also points out some bottlenecks. One very good feature is that 85% of the schools have radio sets but only 1/5 of the schools provide for SBP in their timetable. Radio lessons were largely textual curricular centered. They need to move more towards enrichment type. Script writers didn't receive any type of training. This is an important observation and the media managers should be the main takers.

Audio and Radio Programmes

There are seven researches under this area. Mohanty, M.K.'s (1990) study deserves a close look as one of the findings, indicating that rural children gain significantly less than the urban children, as it has policy implications. Mohanty, M.K. (1990) conducted a study on critical appraisal of primary school radio programmes and their effectiveness for pupil growth. The study revealed that the comprehension of radio programmes by students was moderate and not satisfactory; programmes that had feature/drama/story formats were comparatively better comprehended; rural children as compared to urban children gained significantly less.

Sumitra, L.G.'s (1991) case study has some points that need be kept in view if one desires to shift programmes from broadcast to cassette mode.

Chowdhry, M. (1990) took a development-cum-research project to study the potential of radio programmes for providing enriching experiences to anganwadi and primary school children. The findings are quite interesting. Aganwadi children gained significantly more than their counterparts in the control group in capabilities like listening comprehension, verbal expression, vocabulary gain and sequential thinking. However, no significant difference was found between the experimental and control groups of primary schools.

Dharunkar, V.L. (1992) looked into the research potentials and priorities of the educational broadcasts. He suggests that comparative studies be taken up to assess the effectiveness of educational broadcasts in South Asian countries. Another point that needs attention is the need to fuse together folk and electronic media.

Educational Technology, Meghalaya (1989) took up feedback studies on educational broadcasts and found that the broadcast timing was the wrong one, and preference was more for the afternoon. Teachers were of the view that radio programmes were helpful in their teaching and wanted more programmes in service and languages.

Mishra, S. (1989) took up "A Critical Analysis of Primary School Radio Programmes" and found that radio programmes in "song" and "story" format were liked by the children most. However,

children did not like "quiz" and "talk" programmes. The researcher has also observed that child artists are not invited to narrate stories. He also observed that children did not like long programmes.

Harjal, N. (1992) took up a case study of science broadcasts and found that around 20% to 30% students listen to the programme. Out of this lot, 64% rated programmes as "satisfactory" and found the language "easy to follow". The respondent also saw links between science programmes and economic development.

Sumitra, L.G. (1991) has presented a case study of the audio cassette project of Hoshangabad (M.P.) for teaching Hindi. It would be interesting to note that the project first originated as a Radio Pilot Project in the early eighties and was launched by the CIET in two districts of Rajasthan. When the project completed its life, it was re-launched in one of the districts of M.P. where also, like Rajasthan, Hindi is the first language. In the re-launching stage in primary schools and Hosangabad district the Radio Project Programme, which was in the broadcast mode, was changed into the cassette mote.

The salient outlines of the study are as follows:

— Low cost two in one sets have limited life and they need proper budgetary provisions for running and maintaining them.

— Children when interviewed showed their happiness about the programmes and wanted to listen to more of such programmes.

— The best liked programmes were those which had segments of songs, stories, questions and activities.

Microteaching and Teaching Strategies

In the Fourth Survey of Research in Education, researches on microteaching were not reported under the E.T. section. In this Survey, micro-teaching researches find a conspicuous place.

The decision that researches on microteaching and teaching strategies be placed under E.T. has the support of logic. Microteaching is a legitimate segment of E.T. as it uses both the hardware as well as he software aspects of E.T. One could see on the basis of the researches as well as on the basis of theoretical papers that microteaching has carved out for itself a proper place in training methodologies. It would be interesting to study to what extent and with what result microteaching technologies are being used in non education sectors like defence or banks or industries.

There are 13 studies on microteaching and teaching strategies and many of them were done at the Ph.D. level. This shows that microteaching is an important area of research.

Asija, R.P.'s (1990) research indicates that microteaching helps in developing skills in an integrated form and is better than the conventional training. However, both microteaching as well as conventional training were found to have a positive impact on attitudes of teachers.

Dave, C.S. (1987) looked into the relative effectiveness of summative versus mini-teaching models of microteaching in terms of pupils' liking, teachers' attitude and general teaching competence. It is reported that the miniteaching model was found superior to the summative integrative model in terms of development of general teaching competence and also in terms of pupil achievement.

Dwivedi, J. (1988) investigated the effectiveness of microteaching and the development of psychomotor skills in biology practicals. He found that skills relating to collecting, mounting, preserving and the skills related to observation and information locating are better developed by microteaching than by conventional teaching.

Dutta, R. (1990) conducted an experiment to study the effect of microteching on general teaching competence and to see how microteaching influence teachers' attitudes. He found that both microteaching and the additive

pattern were superior to conventional teaching and both proved more effective in developing positive attitudes towards teaching.

Gandhi, K.V. (1992) found that on three variables—"direct and indirect influence, teacher talk and pupil talk,—microteaching was found to be superior to the traditional approach.

Gor, K.V. (1992), in a study on developing teaching competency of primary school-teachers found that microteaching strategies produce significant effect on attitude towards teaching profession, and also found microteaching a very effective technique.

Pandian, C.C. (1987), examined the impact of microteaching on explanation, stimulus variation reacting and questioning. He found that three skills, namely, explanation, stimulus variation and questioning, were used at more than 5% level. It was also found that science teachers (including mathematics teachers) differed from art and language teachers in their use of stimulus variation, explanation and questioning skills.

Pandya, M.J. (1991) conducted a study on the relative effectiveness of microteaching and traditional teaching in development of general teaching competence and reported that student teachers receiving microteaching lessons were significantly better than others taught through traditional techniques on four teaching skill sets—induction, questioning, explaining and blackboard summary.

Singh, L.C. and Joshi, A.N. (1990) took up an in-depth case study of work done in the area of microteaching in India. The case study monograph looks at the emergence of microteaching as a training technique, its adoptation, diffusion and institutionalisation. The case study also teases this technique into its elemental parts of overt behaviours and presents a case for the Indian model.

Tripta (1989) has done a case study of microteaching as an innovation and has foreseen the need of an organisation which would promote innovation in teacher education. Her work covers the States of Gujarat, Madhya Pradesh, Himachal Pradesh, Jammu & Kashmir, Rajsthan, Punjab, Chandigarh and Delhi. Her recommendation that there ought to be a body to document disseminate and promote innovations in teacher education will be realised as the NCTE has been set up.

Verma, B.S. (1988) conducted a study on "Developing Teaching Competency among Student Teachers of Science group through Microteaching". He has reported that the experimental group after the study developed a more favourable attitude towards microteaching. He has also reported that in the experimental group, urban and female student teachers did better than rural and male ones.

Wadhwa, B.C.'s study (1988) related to the factorial structure of attitudes of teacher-trainees towards microteaching. He looked into ten factors (functional device, functionless device, power, worthlessness, radicalism, utility, functional goals, behavioural radicalism, universals for teaching and lack of interest) and concluded that microteaching is a functioning, powerful and valuable instrument.

The following studies are an amalgamation of teacher behaviours, classroom interaction patterns and microteaching.

Alexander, P.'s (1989) study focuses on classroom interaction at higher secondary level. It is a study on the soft side of E.T. The objectives prompting the study were to observe and analyse the classroom behaviour of teachers and students. The study revealed that most of the behaviours were explaining, illustrating, and asking low order questions. The least occurring behaviours were appreciating student questions. Very rarely teachers used students responses to further an argument or a point of view. On the whole there was more of teacher talk and less of student talk.

Arockiam, A.'s (1990) study related to strategies in developing questioning skills among primary school-teachers. The researcher developed a self-learning package on the skills to ask questions. A group of teachers was trained on the questioning skills through the

use of the package. After the study, teachers improved their questioning skills and the self-learning package was found to be effective. The study touches an important problem. Questioning skills is a potent field and needs more attention and efforts. Ideally, questions should buildup curiosity. But the fact of the matter is that questions, if asked thoughtlessly and in an aggressive tone, instill fear and diffidence, and thereby mutilate or strangle curiosity.

Dubey, A's work (1989) related to effectiveness of a training strategy for developing the 'feedback-giving-and receiving competence' of student teachers. Feedback training strategy is crucial to improve the quality of the instructional output. The training strategy on feedback may include theoretical orientation of feedback, observing model feedback through video film, and live demonstration. The researcher found that the experimental group significantly developed both feedback receiving and feedback giving competencies.

Gill, T.K. (1990) researched on the "Effect of Training Strategies on Creative Problem-solving Skills and Cerebral Dominance in relation to Intelligence, Personality and Cognitive Style". The researcher found that irrespective of training, introverts and students with high I.Q. scored higher on originality in solving mathematical problems and that training the right hemisphere promoted the whole-brain or integrated mode of learning. He also found that right brain training emerged as a superior strategy so far as creative problem solving in mathematics was concerned.

Singh, H. (1990) studied the effectiveness of different integration strategies for developing teaching skills. Instead of going to microteaching of communication skills, the researcher integrated a bunch of skills and undertook training of skills through "mesoteaching" and found that by using the "mesoteaching" approach—Diode additive strategy of interaction—showed significant increase in 'accepting feelings', accepting pupils ideas', 'asking questions' and 'student initiations'.

Lecturing and silence were minimised substantially. On the whole, meso and microteaching were effective in improving general teaching competence.

Singh, L.C.'s study (1989) makes an effort to find out the effectiveness of two training strategies in developing teaching competence. The study was sponsored by the UNESCO Regional Office, Bangkok. One group of student teachers was exposed to Observe-Demonstrate-Practice (ODP) teaching strategy, i.e., observe good teaching in the real classroom situation, then see a demonstration on video film on a particular teaching skill, followed by practice. In another teaching strategy the sequence was Demonstration followed by Practice followed by Observation (DPO). The results of the study indicated that both the teaching strategies were significantly effective in gaining understanding of microteaching and in developing a positive attitude towards teaching.

Das, R.C. et al., (1988) have researched on the comparative effectiveness of selected strategies of teaching skills and found that additive intervention proved to be more effective and thus merits close attention.

Dasari, R.P. (1989) took up a study, "Learning Experiences and their Effectiveness in Teaching", and found that concrete and reality—grounded learning experiences increase perceptual level and thus promote learning, whereas language experiences increase abstractness and objective and model experiences increase concreteness.

Kulshreshta, S.P. and Goswami, S.K. (1982) looked into the relative effectiveness of mini and microteaching approaches to teacher training programmes. They found no significant difference between the gain scores on micro and mini-teaching approaches. The second-order reaction was, of course, interesting. They found that pupils of teacher trainees taught through the mini-teaching approach scrored significantly higher than those trained through the microteaching one.

Passi B.K., Singh, L.C. and Sansanwal, D.N. (1989) researched on the effectiveness of strategies of training in models of teaching, using different teaching models. They found that training strategies (in the form of lecture-discussion, demonstration and peer practice) in Inquiry Training Model (ITM) and Concept Attainment Model (CAM) enhanced teacher educators' understanding of the theoretical aspects of ITM and CAM. They also found that various training strategies brought significant positive changes in their willingness to implement the models.

Singh, A. (1990) looked at models of teaching and their relative effectiveness. He found that MMT_2 (Presentation of demonstration, followed by theory followed by phase-wise demonstration and discussion) was significantly more effective than MMT_1 (presentation of theory followed by phase-wise demonstration and discussion) in terms of developing theoretical understanding of Advanced Organizer Model (AOM).

COMPUTER ASSISTED INSTRUCTION AND PERSONALISED SYSTEM OF INSTRUCTION

It is interesting to note that though Computer Assisted Instruction is a virgin field, it could lure only three researchers. Looking at the trends all the world over, it is expected that Indian researchers would go into computer education more enthusiastically. One can only hope that this fertile field will not go unnotified and many more studies would be taken up in this area. On another front of PSI there are four studies. Like programmed instruction, PSI seems to be a theme of diminishing interest.

Singh, R.D. et al. (1991) took up the study to see the effectiveness of Computer Assisted Instruction (CAI) in teaching mathematics. He found that students who used the computer scored significantly higher than those taught through the conventional method.

Dasgupta, D.'s (1988) study revealed that the Personalised System of Instruction (PSI) group performed significantly better on end tests than the conventional group. On retention and attitude tests, there was no significant difference.

Jeyamani, P. (1991) developed a Computer Assisted Instruction (CAI) package in physics for Class XI students. The experimental group received CAI and after the experiment it was found that the experimental group performed better on the post test. The differences were insignificant in terms of sex and medium of instruction.

Odud, Md. Abdul's (1989) study "Effects of Strategies of Instruction on Mastery Learning", highlights the most commonsense feature that formative evaluation pays significantly if followed by adoption of corrective measures, quality instruction and self-evaluation. This potent instructional strategy leads to mastery learning.

Rose, A.S.V. (1992) prepared the software for CAI. This was used alongwith the without a trainee support system for teaching under-achievers. The results were positive. However CAI used in conjunction with the trainee support system proved to be more beneficial to the under-achievers.

Singh, S.B.'s work (1988) related to the effect of objective based RCEM system and PSI on cognitive attainment of children in physics and finds that PSI and the objective-based system both are superior to traditional teaching, and among the two methods themselves the researcher finds no significant differences. It is also found that when it comes to "application" both objective-based and PSI had no significant difference on the performance of low achievers.

Verma, B.C. (1991) conducted a study, "Effects of Personalised System of Instruction (PSI) and Mastery Learning (ML)", on achievement of average students and students promoted on lenient criteria. He found that both techniques were better than conventional teaching. He also found that 'promoted" students (low achievers) when taught through the PSI or ML approach performed significantly better on the summative test as compared to pass

students (average achievers) taught through the conventional method. It implies that low achievers, if taught through PSI techniques, can perform better. It is a pointer to the problem of low achievement which can be effectively tackled.

Programmed Learning

Programmed Learning was the key theme of researches in the sixties. With the passage of time, the emphasis shifted to other emerging themes. It is interesting to note that half a dozen research studies were done in this area even in the nineties.

This section includes researches on Programmed Learning, on self-instructional film strips, on development of self-instructional modules, on research methodology. Following are the six studies specifically on Programmed Learning.

Debi, M.K. (1989) worked on "Development and Testing the Effectiveness of Programmed Learning Material (PLM) in the Syllabus of Principles of Education in B.T. Course of Gauhati University". It was found that students taught through PLM performed better than students taught through traditional methods.

Joshi, M. (1988) conducted a study on the effects of test anxiety and intelligence on the performance of high school students, using programmed instruction material in linear and branching styles.

The researcher found that when taught through PLM low test anxious students perform significantly better than high test anxious students and so also students with high intelligence. The researcher found both programming styles equally effective.

Sharma, AK. (1989) conducted a study on "Effects of Linear and Branching Instruction Strategies on Performance in Social Science of Tribal High School Students", and found that students performed equally well when taught through PLM developed in both styles linear and branching. Further students performance was independent of academic motivation and test anxiety.

Manoharan, M. (1988) took up a study on "Relative Effectiveness of Print Media" and found that when one learnt with three printed media together (newspaper, magazine, folder) gains were far more than when learnt through a single medium.

Another quite interesting finding was that young respondents (upto 30 years) gained significantly more than those in the middle age group (30-45 years).

Srivastava, D. (1990) conducted an independent study on "Programmed Learning (PL) as a function of Anxiety under Different Motivational Conditions and found that PL as a teaching device is particularly useful for low and average achievers. Knowledge of results was a good motivator in itself. But the researcher found that if it was reinforced with praise by the teacher, it contributed additionally.

Ambli, S. (1992) studied the step size, extrinsic-intrinsic reinforcement and overt-covert response transformations in reading materials and their interaction on learner performance. The researcher found that step size was of significance only in the girls' sample. With small step materials girls learnt better but the response mode was found to have significant impact both on boys and girls. On the "thought provoking" response mode, both girls and boys did better.

Film Strips

There is only one study on Self-Instructional Film Strips.

Usha, P. (1990) conducted a study on preparing and evaluating self-instructional film strips on Nutrition and found that on the recall test (knowledge) those students got higher score who studied alone with the help of self-instructional film strips, i.e., treatment No. 2. On other objectives-understanding, application, and skill—the gain score was found to be significant for all the three treatments.

There is one study on development of Self-

instructional Module in the field of research methodology.

Yadav, M.S. et al. (1989), keeping in view the spirit, not the form of programmed learning, developed twelve modules, self-contained and self-instructional, on research methodology. The modules went under the same chain of region that are needed for developing any self-instructional material. The materials were tried out and modified. Before the final draft the researchers got them edited by professional researchers. The result is a bunch of self-contained modules of research methodology.

Teaching Aids

There are two researches both of the survey type, on teaching aids. Such surveys help in projecting the state-of-the-art.

Educational Technology Cell, Meghalaya undertook a project to survey teaching aids in English medium schools of Meghalaya in 1988. It will be interesting to recall that in the first phase of the E.T. project, of the Government of India, E.T. cells were set up in a phased manner all over the country. Their mandate was to promote use of education technology and media programmes to improve the quality of education in their respective States. The E.T. Cell, Meghalaya, was set up in the late seventies. This survey (1988) seems to have fulfilled the objective to record and document the availability of teaching aids in the State and their use by teachers. The survey revealed that only 26% of schools had proper teaching aids and 60% of teachers were either matric or less qualified.

These two strong indicators justified the "Operation Blackboard" which the Central Government is currently launching with state governments all over the country. Its overall objective is to promote in all schools the minimal threshold facilities to effectively transact the curriculum.

Singh, Satvir (1990) surveyed the availability and use of teaching aids in middle and secondary schools of Jammu & Kashmir, Kerala,

Orissa and Uttar Pradesh. The survey concludes that Kerala is the state which makes the maximum use of the teaching aids. It is also the state where adequate teachers are trained in the use of teaching aids. Audio cassettes were also used in teaching of music. Schools in Orissa made the use of films relevant to classroom teaching.

Mehra, V. (1988) conducted a study to investigate the effectiveness of the integrated system of instruction in different school climates. She designed an integration system and compared its effectiveness with the traditional system in two institutions which had a different school culture, e.g., authoritarian and democratic. Her findings were:

— The integrated system of instruction yielded better results.

— High IQ students attained more in the authoritarian than in the democrative school climate, while low IQ students performed equally well in both climate schools.

On factors like retention and initiative, she found that retention is exhibited more in the democratic than in the authoritarian school climate and that the democratic school climate helped low IQ students develop more initiative than high IQ students.

Solachi, T. (1991) conducted a study on availability and utilisation of Education Technology in the higher secondary schools of a district in Tamil Nadu. The study revealed that the utilisation rate was higher in urban schools as compared to rural schools. Government and aided schools also differed in their utilisation rate. The aided schools did a better job. Between boys and girls schools, the boys schools utilised E.T. more. Science teachers as compared to Humanities teachers utilised more of non-projected and projected visual aids. They also utilised more of community resource technology.

Passi, B.K. and Pal, H.R. (1982) undertook a study to prepare a multi-media institutional

module for developing the skill of observing classroom behaviour; self-instructional materials (SIM) were developed through trials of 'draft-review-modification' cycles. Reviews were gained through expert judgement and student reaction. It was found that the experimental group using SIM obtained significantly higher mean scores on the criterion test. Students' reactions towards SIM were also positive.

EDUCATIONAL NEWS REPORTING

There are four papers on Educational News Reporting.

Ahmed, Syed Amjed (1992) contributed a paper in *Indian Educational Review*—"A Perspective Analysis of Two English Dailies"— where he has assessed the nature of educational news. He reports that educational items covered the educational issues, events, teacher and student problems and matters relating to the curriculum. He also found that educational news takes the largest slice of the cake and the smallest goes to book reviews.

Dharunkar, V.L. (1992) looked into Educational Reporting of regional newspapers. He found that papers covered educational scandals, examinations, campus news, educational achievements (examination results), educational problems and articles relating to educational policy.

Kamat, Kusum (1990) conducted studies on the applications of educational technology in India and reported 10 case studies. Some case studies are on school readiness, some on in-service training of teachers and some on personalised education.

Malhan, P.N. (1992) analysed educational news culture and educational journals and has given his views on the concept of educational news; how to undertake educational news reporting and what the different norms for different media are, and has also discussed the social responsibilities of educational journalism.

CONCLUDING COMMENTS

Looking at the overall bulk of researches in E.T. one can evince a sense of satisfaction. The coverage is widespread and comprehensive researchers have put in labour, efforts of kind and conducted their affairs meticulously. But looking to the quality of researches one is constrained to opine that there is enough scope for improvement. Large number of researches on ETV or PL or PSI are methods comparative studies and have spawned sterile results. The studies on microteaching, again, are comparative studies and conclude on the expected note that through micro-teaching competencies related to classroom instruction improve. This trend needs close review. The unchartered field of illuminative, in-depth phenomenological research studies lie unexplored and needs to be explored more vigorously.

Lack of Coordination

The author agrees with the observations of Buch, M.B. (1991, p. 40) that "Research activities in Education are going on without any coordination." This is an euphemistic way of putting things. To put it bluntly, the policy on education research is weak and diffused. Although a lot of money and time is spent on conducting researches, the output, however, is hardly commensurate with the efforts put in. The result is, there are a few arcs here and there; the full circle is missing.

Disseminating Research Results

Research in education should not be done for *"Swanta Sukhya"*. Researches, jointly or individually should help the classroom practitioner or the policy-maker in one or the other way. If the bulk of educational researches fail to reach and educate the practitioners of education and the policy planners we can infer that there is something wrong in the system. There is a need to ensure that the function of

dissemination gets priority. It would be a worthwhile to explore whether it can be a definite job function of the NCERT or the SCERTs. When the NCTE becomes operational should it be one of the functions of to undertake the dissemination role. The author does not agree more with Gagne (1978) when he says:

> The whole process of two-way communication between the R & D community and the schools must be institutionalised. The function of dissemination must be identified as a definite job function in the R & D organisation...(Gagne 1978 p. 90).

This point of dissemination of research findings is peripheral to my present task of trends monitoring but has a massive bearing on establishing solid links between (i) policy (ii) teaching (iii) research. We can make a solid triangle only if we join them by proactive links.

Replacing Technical Jargon: Making Results Understandable

Research findings become meaningful and relevant, if reported clearly and properly. Research reporting is both a technique and an art. It is a technique as it follows a format, a pattern, a system. To seek international acceptance, the researcher has to remain within the confines of a given format or a pattern. But reporting is an art, too. If the vocabulary of the researcher is not understandable by the reader, reporting makes little sense. This implies that the technical jargon of the research should be made intelligible for the classroom teacher. Researchers are prone to use language which is terse, technical and esoteric. When the classroom teacher consults these studies, he feels baffled, confused and lost. In this lot there are many instances which justifies this comment. One of the remedies is to recast important findings in layman's language. The other step that needs to be taken is to re-design the teacher education curriculum in such a way that primary and secondary teachers get familiarised with the researcher's language. This means whenever teachers browse over research

literature, they are able to make out the meaning and do not feel lost in technical jargon.

Honing Impact

The reporting of research findings has another dimension towards which most of the researchers turn a Nelson's eye. It is the verve and vigour with which the researcher reports his findings. It is the language and the force of language used by the researcher. Often the unconventional findings are put in goody, goody, sugarcoated style. They lack the brilliance and the bite and impact of a drawn sword. Research reporting with some measure of an aggressive and assertive tone does not demean the 'tentativeness' of research findings.

A researcher's language need not be dull, drab and monotonous. At times modesty and humility may be virtues but at other times they are not. A researcher's honesty of purpose and courage of conviction should help and goad him to coin richer idioms as to express pithily and with force. Committed expression has a purpose. What it does is to crush the intellectual inertia that pervades our educational institutions. To give a jolt and kick to conventional wisdom is not an unethical act. It is achieved if the researchers put teeth in their reporting. As our self-complacency and weakness in reporting is overpowering, it would need Himalayan efforts to shake us out of our "maintenance" slumber. I labour this point to say that many researches which have come up with "unpalatable" findings (which is the most needed thing in my view) have reported them in subdued tones.

Preponderance of Quantitative Research

All the studies under review have the ring of scientific inquiry. Hermenetic approach is sadly missing. If the hermenetic approach is weak and soft, comparative and analytical models are not without fallacies. To gain an illuminative understanding of a phenomenon it is imperative that researchers also resort to in-depth case studies and give prominence to subjective

interpretations where context is as important (if not more) as statistical jugglery. Similarly, there is a need to take up a few policy researches on E.T. or what Bondi (1983 p.11) calls, "strategic research".

The Social Aspect

It has been said that the social responsibility of business is to increase its profits (Friedman, 1970). By the same analogy the social responsibility of E.T. is to enhance the internal efficiency and to increase access to education. If an E.T. enterprise fails to achieve both or one of these meta-objectives, it had better be discarded. A researcher has to fix his focus on this issue of the social responsibility of E.T., and design his study accordingly. The aspect of the social responsibility of E.T. has to be researched and researched finely and extensively.

Overemphasis Method Comparison

The bulk of the 76 researches have overused a comparison approach. There is nothing against the comparison approach but the fact of the matter is method comparison or media comparison although important does not lead us anywhere. In any teaching learning situation, the student's achievement necessarily does not depend upon "a single method". Thus what is important is not comparison of method 'A' with method 'B' but comparison of one mix of methods with another mix of methods. This point becomes very obvious when one goes through the research in educational technology.

Another area which would immediately capture our assessment is that there are many problems related to management, production, transmission, reception and impact of TV and radio programmes. Appropriate researches need to be taken up, not to suggest any solution but as a trouble shooting step.

Values and Education Technology

The point with which one would like to conclude

is quite important. E.T. inputs in any educational enterprise are not value free. They have a social context and impinge upon the world of teachers, managers and parents. Researchers have to look into it more closely. That is how the use of E.T. reformulates and restructures the role and functions of the teacher, the headmaster, the parent and the students. The researcher also has to go deep into the negative side of E.T.—the commercialisation of E.T. and how it can be combated.

Education Technology is not only an effective way but an efficient way of tackling educational issues, i.e., E.T. inputs have repercussions on the cost and time aspects. Some researches need to be mounted so as to see how the use of E.T. helps (or hinders) in cutting educative costs. There are questions such as: How can we cut capital or recurrent educational costs? How can E.T. cut the cost to the students? How can E.T. help us teach the same quantum of content in less time with more or equal quality? These are questions which stare us in the face. To these issues, we hope the researchers would turn their gaze tomorrow. What should have been done yesterday, should now be done tomorrow positively.

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