TEACHING SCIENCE THROUGH TELEVISION

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We are living in a world of science. In every sphere around us we can feel and see as well the terrific impact of science and technology. With the tremendous progress of science and technology, it has become necessary for every man to understand and apply science to his day-to-day life. Contents of study have increased to a great extent. Teachers have to teach and the students have to understand more matter in a given period than they used to do previously. The concept of education has undergone a change. It is not merely the understanding and memorising a body of facts, but is considered to be a process which prepares an individual to become a worthy member of the society. For educating children for life, improvisation of teaching techniques with the help of audio-visual aids has become necessary. Audio-visual aids which include sound films and televisions, are considered to be the most important of all teaching aids. Television is one of the most significant discoveries of recent times in the field of communication.

Scope of TV

Television, which has the best elements of both the radio and the film, has made a tremendous impact on spectators. The scope of TV in education is immense. The learning process, which involves all our senses to the fullest extent, is perhaps the best. Our senses of hearing and seeing contribute about 85 per cent towards the total knowledge gained.

TV in education can either be used as a teaching aid or as a teaching machine. Carefully selected TV instructional programmes can supplement the classroom teaching to a great extent. TV instructional programmes can be developed in almost all the subjects, from the languages to science. Particularly, TV instructional programmes make the study of science easier and more meaningful. Teaching through close-circuit TV, which is a type of teaching machine, has found tremendous encouragement in the developed countries due to its immense usefulness.

Close-circuit TV is a far cry in our present set-up. So, let us confine our discussion to the TV instructional programmes, which are being telecast from the Delhi TV station.

TV as a Teaching Aid

As already mentioned, TV as a teaching aid has tremendous potentiality. Competent and experienced teachers can give demonstrations and talks on TV. Experiments not easy to perform in the classroom situation and the models not easily available to schools can be shown during the TV lessons. A complete topic like flowers, halogens, etc., can be taught through TV. Experimental techniques can be explained and the working of industrial processes can be shown

through TV films. So, we see that the ways of using TV as a teaching aid are many. For the most effective use of TV, there should be a good programme and for chalking up of good programme certain points are to be remembered.

(i) *Objective:* It should be always remembered that the TV teacher cannot replace a classroom teacher. He can only help the latter in his teaching a topic or a subject. Objective of TV lesson is only to supplement the classroom teaching.

(ii) *Planning:* Planning is the most important part of a TV lesson. For this, the grade or the class for which the lesson is prepared, the chronological age of the pupils and their intelligence and abilities have to be carefully considered.

Then, there is need to scrutinise the syllabus on the basis of the objective laid down and the portions have to be chosen accordingly. Also, consideration should be given to the problem of textbooks i.e., their worth and availability.

Lastly, the duration of the lesson is an important point to remember.

(iii) *Quality:* The quality, both in terms of the subject matter and the teaching method, should be of the highest order.

(iv) *Preparation of the Students:* One of the factors influencing learning is the 'readiness' both mental and physical. The students can be made mentally ready by arousing their curiosity. This can be done in several ways, e.g., by showing fascinating experiments relating to the topic or by connecting the pupils' previous experience and knowledge with the topic. For making a child mentally ready to accept the lesson pre-telecast activity with carefully chosen questions is essential. This requires good preparation on the part of the classroom teacher. Also, guidance sheets and programme booklets meant to help the classroom teachers should be pro vided with.

To ensure maximum physical readiness on the part of the pupils they should be provided with maximum viewing comfort. The TV set should be placed in a suitable position, so that every student can view it properly, in a room specially meant for TV viewing. The room should have adequate lighting arrangements and comfortable seats. The number of students viewing the TV should be such that those sitting at the back may have a good view of the programme.

(v) *The School Time-table:* TV timings should be such that it can be adjusted comfortably within the school time-table.

(vi) *The TV Teacher:* The TV teacher should have the calibre and personality of the highest order. He should be an experienced teacher with vast knowledge. At every aspect a TV teacher should at least be equal to the classroom teacher, if not better.

Present Position of Teaching Science through TV

In India the school television project was launched in the year 1961 in Delhi. The TV lessons are closely related to the syllabus. The TV teacher works in collaboration with the classroom teacher. Usually one TV lesson per week per subject is telecast. Some of the important topics from the syllabus are chosen for TV lessons. TV lessons in science are broadcast for Classes VI, VII, VIII, IX and X. In

the year 1971-72, no TV lessons were broadcast for Class XI. The TV teachers, drawn from various schools, are mostly quite competent. Guidance sheets and programme booklets are sent to the schools concerned regularly. During the lessons, efforts are being made to use other audio-visual aids like charts, models, etc., as much as possible.

Checksheets are invited from the classroom teachers whereby they can comment on the effectiveness of the lesson.

But in spite of such commendable efforts on the part of the TV centre officials, it seems that the programme of 'instructional TV' has failed to make the desired impact on the children. The causes are manifold.

(i) *The Examination System:* The most important cause seems to be our examination. Every action of the teachers as well as the students is oriented towards passing the examination, even if it is at the cost of knowledge. So any portion of the educational programme which does not have any direct connection with the process of securing marks in the examination is treated by the teachers and students alike with scant respect. It is quite obvious that even if there had not been arrangements for TV lessons, the students would have passed the examinations, the usual way, without much difficulty.

(ii) *Lack of Good and Quality Planning:* This is a very important part of the TV lesson. Before the students can accept the TV lesson, a mental background has to be formed. This is done by questioning. Motivation with the help of interesting experiments, which is extremely useful in many cases, is not done usually. Quality of the TV lessons is also, sometimes, not of the highest order - matter not being selected with care. For example, in a lesson on bleaching powder, it is perhaps useless to show its properties, because it is expected that in their regular classes the students have already seen those experiments, as these are quite easy to perform. So, during such TV lessons it is not expected that the students would be attentive.

(iii) *TV Timings and the School Time-table:* Often it is found that the school time-table does not correspond to the TV timings. This makes the pre-telecast and the follow-up activities difficult and thus the effectiveness of the TV lesson is greatly diminished.

(iv) *TV room:* Many schools do not have a separate TV room. TVs are kept in the hall or in the classrooms. So, the proper lighting arrangements which are very much necessary for good viewing are missing. Then, the number of students viewing the television programme is in most of the schools very large, and also proper sitting arrangements for the pupils are not available. Hence, the students sitting at the back can hardly have a good view of what is going on, on the TV screen.

(v) *The TV Teacher:* It would be better if the TV teachers are more carefully selected, keeping in view the fact that they should be better teachers in every respect than the average classroom teacher.

(vi) *Guidance Sheets:* Guidance sheets and the programme booklets are often not received in time and hence their purposes are lost.

Suggestions for Increasing the Effectiveness of TV Lessons

The students have to be made 'mentally' as well as 'physically' ready, as much as possible, to get the maximum benefit out of such instructional TV programmes.

(i) *Mental and Physical Readiness:* For mental readiness the students have to be made curious by (a) making proper pre-telecast activities (this requires the availability of the guidance sheets in time and correct adjustment of the TV timings with the school timetable), and (b) showing some interesting and thought provoking experiments in the beginning of the lesson, e.g. to introduce the lesson on hydrogen, experiments showing the explosion of soap bubbles filled with hydrogen, flight of gas balloons and film on the explosion of Hydrogen Bomb, can be used with advantage. For junior class pupils, with very little background, stress should be given on experiments by which they are easily awed and those which touch their imagination, while the experiments for the higher classes may be of such type which depict a problem and make them think over it. For example, the topic on the heating effect of current is taught in Class VIII as well as in Class XI. For Class VIII students, the approach towards the lesson may be made with the help of such experiments as exploding of Gun Powder by putting a coil of wire inside the powder and allowing electricity to pass through it or by showing the operation of electric furnaces, heaters, etc. For Class XI, the experiments may be somewhat thought provoking, for example, two equal halves of a piece of resistance wire are taken - one is coiled, and then both are attached to the terminals of two batteries separately and a drop of paraffin wax is dropped on each piece of wire and the electricity is allowed to pass through both of them. The paraffin wax will be seen evaporating very soon from the coiled wire; but not from the other one.

For maximum readiness on the part of the students, a TV room with proper lighting and sitting arrangements should be there and also the number of students viewing the programme should not be above 30.

(ii) *Quality of the Lesson:* Next comes the question of the 'quality' of the lesson. Under the present circumstances when it is not possible to provide more than one TV class for each grade, the subject matter of the lesson is very important. Endeavour should be made to clear the fundamentals of a subject than to cover as much portion of the syllabus as possible, e.g., in chemistry topics like Graham's Law and Phosphine may be omitted while more time may be given to the discussion of the topics like 'Theories of Chemical Bonding'; 'Electrolysis and its Application' and 'Periodic Classification of Elements'.

Further, the lessons should be free from errors and omissions, e.g., 'ionisation' and 'dissociation', these two terms are often used in the same sense and the omissions like the time of contact of the reacting gases with the catalyst in the Ostwald's process for the manufacture of nitric acid, and the reaction between arsenious oxide and the gelatinous ferric hydroxide in the purification unit of the

Contact Process for the manufacture of sulphuric acid, are often found.

Models and charts should be extensively used; but when an actual process can be shown either by direct experimentation or by the use of film strips then using a model, instead, would minimise the effectiveness of the lesson. For example, the circulation of blood—instead of using a model to explain the circulation process it would be better either to use a film showing the actual circulatory system in a man or dissect a frog and then show its circulatory system.

(iii) *Laboratory Techniques:* The laboratory techniques are totally ignored. No lesson which demonstrates laboratory techniques is telecast. Correct use of balance, screw gauge, microscope, etc., can easily be demonstrated on TV. Certain manipulative skills like bending of glass tubing, boring of corks, dissecting frogs, etc., are very important and can be demonstrated by experienced and skilled teachers. These procedures would enable a larger number of students to be benefitted because the manipulative techniques can be shown at close range on TV.

(iv) *Home Assignments:* Provision for home assignments based on TV lessons may be made. This, automatically, would encourage students to watch the lessons more carefully.

(v) *Tele-Club:* A Tele-Club may be formed in each school. The activities of the club may be (a) watching all the TV programmes and discussing and writing about them; (b) understanding the mechanism and scope of TV; and (c) holding essay competitions on the usefulness of various TV programmes and so on.

(vi) *Parents' Attitude:* Lastly, the parents' attitude towards such TV instructional programmes should be ascertained and they should be convinced, if need be, about the usefulness of such programmes, so that they may encourage their children to watch such programmes attentively. They may discuss about the TV lessons with their children, judge their reactions, try to remove their doubts, and inform the TV centre or the school subject teachers about their findings. This will definitely inculcate among the students a habit of watching the TV lessons carefully and thus being benefitted out of it.

Conclusion

About the vast scope of TV as a medium of instruction, there is no second opinion. Educating masses is one of our national objectives. This goal can be reached more easily by teaching through TV than by ordinary classroom teaching in a school situation. The Government is quite aware of this fact and hence in a few years' time, a network of TV stations is coming up in various parts of the country. So, it is not unusual to think that within next five years, science students in various regions will be benefited by the instructional TV programmes. From the experience of organising such programmes for Delhi TV Centre, it would be possible to chalk out instructional programmes of the highest quality. Hence, there is need to have an honest look at the present position of TV teaching and thus find its defects which, once spotted, can be removed easily.