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# Video Cassette Technology: A Complement to Educational Television

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Suatu lagi teknologi baru, Pita Rakaman Video Kaset (PVK) telah dibawa masuk ke dalam sistem pendidikan negara kita. Bahagian Perkhidmatan Sebaran Pendidikan, Kementerian Pelajaran Malaysia telah melaksanakan suatu kajian atas ketahanan serta kebolehan mesin tersebut melalui suatu Projek Perintis PVK yang telah bermula dalam tahun 1979. Kertas ini membincangkan kesan pencapaian jangka panjang yang boleh diperolehi dari alat media itu dalam persembahan pembelajaran ke bilik-bilik darjah. Di samping itu, kertas ini juga mengemukakan beberapa faktor yang menyokong kegunaan mesin media baru ini: (i) peranan PVK sebagai suatu alat yang boleh mengatasi beberapa masalah yang sedang menghalang kegunaan Televisyen Pendidikan dengan kesan, dan (ii) bagaimana seseorang pengguna dapat mengeksploit segala bentuk sifat-sifat kecekapan yang terdapat daripadanya demi memberi penilaian yang lebih berharga kepada Televisyen Pendidikan di dalam negara ini.

## Introduction

Media development in our educational system has taken another step forward. A comparatively new technology has been brought in to set us on a level with educational media progress in the developed countries. The technology that has descended into some of our educational institutions is in the form of the Video Cassette Recorder (VCR). The debut of this rapidly improving hardware has brought along with it aspirations for an enrichment of our educational environment.

Like the audio tape decks that record sound from radio receivers or live with microphones, the VCR records both pictures and sound on reels of magnetic tapes housed in cassettes about the size of paper-back books — a fusion of technological advancement in three specialised areas: *optical, audio and magnetic electronics*.

It is the instantaneous magnetic recording of picture and sound on an iron oxide coated (Mylar) acetate tape quite similar to that used with audio tape-recorders, except that the video tape can be up to as much as 8 times wider and is recorded and played back at a very much greater head-to-tape speed of up to 1,000 inches per second with good stability.

Several popular makes of the Video Cassette Recorders which are highly competitive both in features and in cost have already appeared in the electronics market. There is however one chief constraint when one tries to embark into the domain of this new technology:— that of *tape compatibility*. Several factors contribute to this problem: tape width, tape speed, tape writing speed, size of the recording head, tape wrap, drum size, scanning format and cassette size.

Initially designed for the professional recording industry during the nineteen-fifties this equipment was bulky, complicated and costly. The past decade has seen the remarkable development in the design and functions of the VCR to a stage where it is now compact, moderately priced and simple to operate. This machine is in the process of revolutionising the video industry and it will not be altogether out of context to state that this new development is bound to play a significant role in our educational progress. At the same time, it can also be fairly accurately assumed that the demands and applications for its entertainment role will far out do the educational use made of it. However, the interest now stirred up among the industrial and educational organisations in this new machine is probably higher than that for any other item of hardware that has been brought out in the past, apart from the application of cine film in the nineteen-twenties. With the discovery of the photographic process and later, the development of the moving image

recording techniques on to film formats, the scope of its role in the educational process widened further and further and the need to exploit the medium fully into an effective educational agent was realised by educators all over the world.

Television or the electronic visual and auditory transmission process made its debut around the nineteen-thirties. Initially it was designed for the entertainment and industrial fields. Its educational importance was realised much later, nevertheless still in good time to stretch its potential to its maximum limits as a one-way communication agent. Over these years television has made rapid technological advances in equipment quality, colour, multi-image screens, simpler recording and playback gear and now, but by no means terminal – the video projection system. Colour discrimination does play an important role in educational television, especially in Health Science, Biology and Chemistry, however there is no overwhelming evidence to show that it helps to improve learning in all the curricula.

All along, there has existed a marked barrier of distinction between the television's educational role as against its entertainment or media agent's role for the masses. When an educational package goes on the air, a great many of the audience may sit up and take note of great many details: technical quality, content of programme, presentation techniques, errors and irregularities, language, relevancy and suitability of support materials and even the competency of the presenter. To put it plainly: one expects a television lesson to be nothing less than perfect!

The advent of Educational Television in this country was in 1965 with the Educational Television (ETV) Pilot Project (KP. 8044, Kementerian Pelajaran, March, 1965). Since the launching of the service in 1972, media lessons via television with their complement of movement, specially designed teaching aids, diagrams and special photographic effects have had a considerable amount of effect in the presentation of difficult and complex components of the school curricula to learners. The involvement of the new medium in our country has certainly brought about new teaching and learning experiences and its integration into the daily class schedule has made it the third most consistent media in the classroom, next to the print and auditory domains. Its capacity to provide a matched auditory-plus-visual stimuli has been proven successful in certain subject areas in the United Kingdom and United States.

It is not the intention of the Ministry of Education to telly-teach the entire school curricula to the students. Traditional and formal methods have worked well all along, but where a broader base is needed to present complicated items of a specific curriculum, the educational role of television has been planned and organised well and has come to stay as an efficient tool of learning. It is therefore left to the innovative educator to exploit to the maximum the characteristics of television in order to increase his instructional efficiency to a group of learners who may otherwise be subjected daily to dull and drab lessons with chalk and talk.

### **Television Capabilities**

The effectiveness of television in its role as an educational agent can be linked to its chief capabilities of image *multiplication*, *image magnification* and *image transportation*<sup>1</sup>.

#### **Image Multiplication**

It is the simultaneous display of the visual and audio stimuli at more than one physically separated location, by utilising several TV Monitors/Receivers.

#### **Image Magnification**

It is the enlargement or magnification of plane dimensions to many times actual sizes. This process is achieved by utilising special close-up and microscopic lens attachments to the TV cameras to distinguish details not observed from normal viewing.

#### **Image Transportation**

It is the ability of television to transport an image instantaneously and simultaneously to different geographical locations in the country and now, via satellites, to different locations in the world. The SITE (Satellite Instructional Television Experiment) project in India<sup>2</sup> enabled the villager in one of the 2,400 villages, some of them remote and inaccessible, in six states to get the benefit of simultaneous programme beaming and brought agricultural techniques, social and

health education to him at his community viewing area.

In spite of the many-faceted advantages that educational television can offer our students, especially those in remote and rural areas, officials of the Ministry of Education have been commenting frequently on the low utilisation of the media lessons via the telly. Over these past nine years ETV has been running into some setbacks and problems, some of which are quite conceivable especially in a developing country where physical constraints in some of our educational institutions fail to provide the atmosphere for effectively administering these mediated lessons to learners.

Principals, school media co-ordinators and teacher-users have at one time or another brought up several problems, the main ones being:

1. Inflexibility of the secondary school time-tables.
2. Too many classes of a particular standard or form. Too few TV Receivers.
3. TV lesson seems to be a "one-hit" medium. There is no opportunity at all for revision or repetition.
4. The incompatibility of 'timing' between the transmission and the readiness of the users to receive the programme.

These and other **problems** have affected ETV utilisation<sup>3</sup> ever since its inception, hindering what would otherwise have been innovative and interesting lesson presentations for the benefit of our students. We cannot assume that these ills will simply disappear if we ignore them long enough or if we give the schools more TV Receivers.

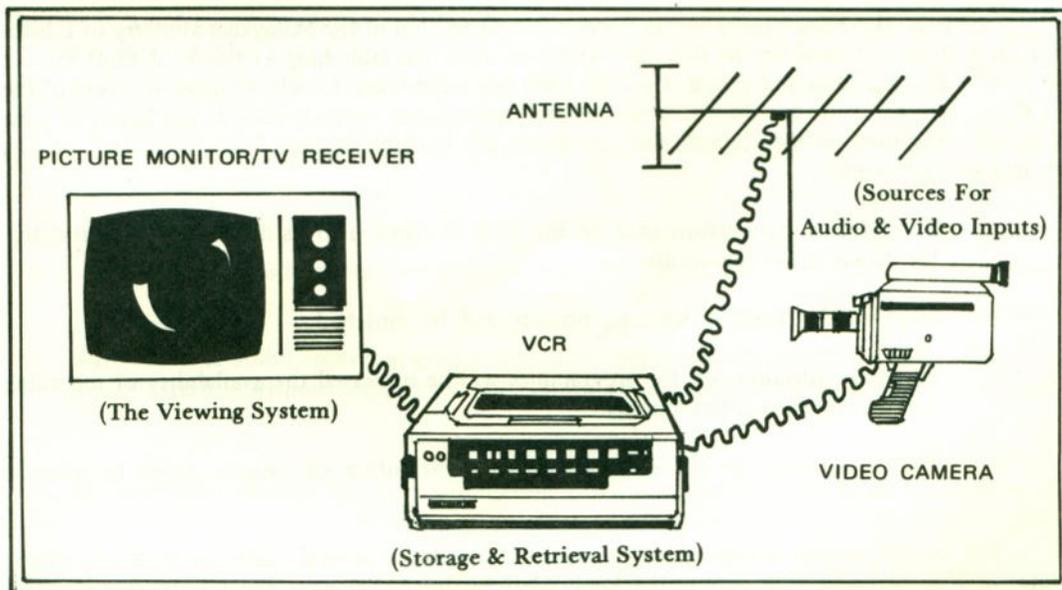


FIGURE 1: VIDEO CASSETTE RECORDER

(A Complement To The TV Receiver)

Thus, apart from employing more stringent checks on TV utilisation in schools and by exposing more and more teachers to the proper usage of these media lessons in the classroom through regular district and state level in-service courses, the Ministry of Education, in its sincere effort to eradicate most, if not all these problems, is endeavouring to bring in a complementary apparatus, the VCR, to the TV Receiver, with the firm conviction that these missed-out media lessons will be

put into full use. A point to be raised here is: *Will the provision of a VCR effectively solve all those problems which at present contribute to low utilisation?*

*It will not, if:*

1. There are still in our midst teachers with an in-built resistance to innovations and changes, teachers with dispositions to adhere to only established ways, teachers with negative attitudes who misimply that their roles in the classrooms may be relegated to one of passivity and lesser prominence.
2. The quality and standard of the TV lessons are not maintained and also upgraded from time-to-time to meet the needs of the learners.
3. The schools are provided with sub-standard VCR's which come to a halt after a brief performance and, if:
  - (a) adequate software (cassette tapes) are not supplied to the schools, to enable them to use and re-use the lessons in a way the Ministry of Education intends them to,
  - (b) adequate maintainance and repair services, personnel and funds to get the machines back into service, if and when they break down are not established.
4. The authorities fail to set-up systematic and phased-out in-service courses to familiarise all the teacher-users with the machine and, primarily to enable them to utilise the VCR in a manner that will bring about more effective learning experiences into the classrooms.

However, the Educational Media Service (EMS) Section of the Malaysian Ministry of Education, has already moved off in the right direction with the launching of the VCR Pilot Project in 1979<sup>4</sup>. The planning and preparation the EMS has undertaken to subject several makes of the VCR to close scrutiny for their mechanical and operational competencies at the hands of non-technical personnel to local conditions and needs are laudable indeed. The objectives<sup>5</sup> of this project are to examine:-

1. The 'Mechanical Performance' of the VCR in relation to its durability and suitability for its use in the classrooms.
2. Whether the teaching-learning process will be enriched.
3. Whether utilisation of TV programmes will be increased the availability of recording and play-back facilities schools.
4. Matters relating to the duplication and distribution of cassette tapes to schools.

The current project involves the systematic utilisation of several makes of VCR's in all the states in West Malaysia with about 30 schools participating in Selangor which have been supplied with pre-recorded cassettes of Language lessons as well as Maths and Science programmes.<sup>6</sup> 8 sets of VCR's have been sent to each of the other states with a limited supply of blank tapes on loan. The selected secondary and primary schools, both in the urban as well as rural areas, have been directed to record the TV lessons 'off-air' and to identify the strengths and weaknesses of the machines as well as the tapes. The roles of the teacher-users, media co-ordinators and head teachers have been specific:- to implement the project fully and to collect relevant feedback for the Educational Media Service Section.<sup>7</sup>

State Media Officers and Officers of the EMS Section have been directed to visit these schools to report on the progress of the project<sup>8</sup> and to interview the users and get to know their

attitudes and opinions on:

1. The mechanical performance of the VCR for the durability of the sets and tapes and to monitor the wear-and-tear of the mechanical parts (especially the tape-heads) and cassettes,
2. The VCR as an aid to teaching and learning,
3. The methods of utilising cassettes for maximum benefit,
4. Number of programmes recorded and utilised and
5. Progress of the project in general.

The EMS Section is at the same time, looking into the feasibility of setting up a central tape duplicating unit for supplying schools with quality pre-recorded tapes of TV lessons. As an alternative, it is also considering setting up regional tape dubbing centres to overcome the many faceted problems that will arise in a central tape dubbing and distribution service. The realisation of this second phase of the media service development brings into critical attention the colossal financial implications for the Ministry of Education. Predictably, various complexities will confront the implementation of this phase: the supply of video recorders and video cassette tapes to schools; the setting up of the central or regional tape dubbing centres; the establishment of the technical infrastructure for the maintenance of the machinery and the careful monitoring of the project in all its entirety. Further, the TV Receivers supplied to the schools at the launching of Educational Television are nearing their 9th year of service. These sets are ready for the repair-bench. It is not an over-statement to mention that many schools will not be able to meet the cost of replacing a burnt-out transformer, let alone a whole TV set. The Ministry of Education will do well to provide substantial funds to the State Education Department to prevent the ETV project, launched in 1972 from grinding to a halt, as a result of obsolescence.

No conscientious educator, can display a detached indifference to this new facet of progress in our educational system. There has to be total involvement by all concerned in some way, no matter how small, in this new technology which has the potential to reveal valuable sources of enrichment and experience to the young minds in our schools.

**The VCR and its standard features:**

#### **Instant Playback**

Just as in the audio recording system, the video signals are recorded on magnetic tapes and played back instantly without requiring an interval for a chemical developing process.

#### **Pause Control**

A convenient control for tidily eliminating unwanted material, such as advertisements and other announcement-inserts when taping programmes of educational value.

#### **Freeze Frame/Still Frame**

This facility allows the operator to *hold* a certain action in the recorded tape during playback. A stabiliser button will allow for the correct alignment of the picture frame to give reasonably steady and still pictures with minimal distortion. This feature is of immense value when one needs to 'hold' a certain sequence to highlight and to identify certain details, as in the case of the movement of microbes.

#### **Slow Motion**

Enables the viewer to playback a certain action or event in a delayed mood. This feature may be engaged at any point in the playback mode to show the sequence of movement of certain developments that are of special interest.

### Picture Search

A useful feature to index or identify a particular programme if more than one is recorded in one cassette. This feature prevents a lot of hassle with tape and machine.

### Digital Video Timer

This incorporates a digital clock to enable unattended recordings to be made in a delayed-system of up to fourteen days between setting the machine and the recording taking place: (a) This enables the operator to pre-select the actual recording time segment as well as the programme channel. (b) One is able to view directly a programme 'off-air' on one channel while the recorder is simultaneously recording a programme on another channel.

### Cassette Tapes

The tapes are compact and are now capable of providing of up to eight hours' continuous playing time. From a single channel video and audio recording format, video tapes have now advanced to dual track video and audio recording systems on certain continental machines. However longer tape time is not necessarily a standard on which its educational usefulness may be based. Manufacturers offer a warranty on tape life in the region of 100 passes through the recorder-be it in *record* or *playback* modes.

Tape width varies from the  $\frac{1}{4}$ " tape for portable videotape recorders using reel tapes to the  $\frac{1}{2}$ " and  $\frac{3}{4}$ " tapes on the video cassette recorders. Lacking an industrial standardisation on tape width and recording formats, there are now chiefly 4 types of recording systems:

System	Tape Width	Cassette Dimension
VHS (Video Home System)	$\frac{1}{2}$ "	188 x 104 x 25mm
Betamax	$\frac{1}{2}$ "	155 x 95 x 25mm
U-matic	$\frac{3}{4}$ "	222 x 139 x 32mm
Philips	$\frac{1}{2}$ "	127 x 146 x 41mm

TABLE 1: Video Cassette Recorder for Non-Broadcast Use

Source: Anonymous "Video Cassette Recorders" *Choice*, July 1979, pp. 203, 205 & 209.

A distinct common user preference in this region for the VHS and the Beta formats has developed. The U-matic recorders are too complex and costly for the domestic market. Its features are more suited for professional or semi-professional work and for industrial agencies. However educational institutions that can afford them and have the technical expertise to maintain them, do have a preference for its versatility, superior quality and its electronic editing features. The Philips System unique to some continental VCR models only, has a restricted market here. Until such time when a universal standardisation is formulated, this maxim has to be the rule of the day in the matter of handling video cassettes: *A cassette recorded on one format will not reproduce any signal on another format.*

The development of video technology this past decade is indeed overwhelming but one need

not stand back with emotional disapprobation. We can participate happily with this technology without having to get too deeply involved in the technicalities associated with the machinery itself. To put it in a nutshell for all forms of media machines:— *It is not the technology that poses the difficulties, rather its appropriate application.*

Function \ Media	Video	Cine Film	Film Slide	Film Strip
Instant Playback	yes	no	no	no
Record & Erase	yes	no	no	no
Image Multiplication	yes	costly	yes	yes
Image Transportation	yes	no	no	no
Programme Search	yes	no	no	no
Selective Slow Motion	yes	no	no	no
Instant Duplication	yes	no	no	no

TABLE 2: Media Comparison

Source: Adapted from Merrill, Irving R., "Television Capabilities and Instructional Efficiency" in *Television in Health Sciences Education, San Francisco: 1960, pp. 1-7.*

### The VCR – Its Application In Education

#### Repetition

No more the stigma of a one-hit medium. The recorded lesson may be viewed as many times as the need be with the same audience. One of the requisites of the learning process – *repetition* and *reinforcement* – may thus be achieved albeit via an identical format.

#### Flexibility

Offers great potential for the viewing of any specific programmes at a time convenient to the audience. The rigidity of the school schedules will be overcome to a certain extent where classes can be assigned different time slots to view the recorded programmes without undue interruption to the class as well as the subject-teachers' timetables. The educational concept of readiness may thus be readily achieved as recorded programmes are shown at the 'teachable moment'.

#### Tape Library

The gradual build-up of a tape library will help the institution to provide another rich source of reference for the teacher as well as learner.

#### Video Timer

This electronic device enables the set to activate itself at a pre-selected time schedule and to stop recording at the end of the programme, without the presence of the teacher-operator, who may be engaged in another area. Some of the machines can be programmed for up to 14 days in

advance. Thus the VCR can start recording an educational programme of some importance during the weekend, stops recording at the end of the programme, rewinds the tape to the beginning and switches itself 'off' automatically. In the event of a power cut a signal will indicate that no recording has been made.

### Record/Monitor

This enables the VCR to record the same programme viewed off-air. Subsequent groups may utilise the recorded programme later at a suitable time and place. Another special feature is the ability of the recorded to record a programme on one channel while the TV set is engaged in receiving a programme on an adjacent channel.

### Preview

A key feature in the utilisation of the VCR for education. A teacher is able to preview the content of the programme sent to him on tape before it is shown to the students. Alternatively, the teacher could view a programme off-air and simultaneously record it on tape. The recorded programme could be shown at a later time after the teacher has prepared himself with sufficient introductory approaches to the lesson and adequate post-lesson activities and exercises on the topic.

### The Role of the Teacher

The teacher is no longer the ultimate source of information, writing out lesson plans with minute detail and presenting them to a single class or even a number of classes. In mediated instruction, using various kinds of media (including video cassettes) the role of the teacher is to guide and lead his students into ways of solving problems in order to develop independent thinking. "The teacher then becomes a resource person"<sup>9</sup>. In an educational institution, the media user will have the onerous task of making this new technology create an educational atmosphere in which the learning process can be enriched and stepped up to a higher achievement level. Most of all, he will have to endeavour and create a need for this media machine in his institution. He will further, have to maintain a general surveillance on the performance of the equipment and sustain it in a reasonable state of mechanical fitness. He will have to play the role of the demonstrator and take on the uninitiated objectors of mediated instruction and translate the inherent attributes of this gadget into an assimilable ally few educators in this progressive era can do without. Not the least important of all, will be his role as the vital link-man who provides feedback on the mechanical performance, educational value and instructional capability of this video machine. The final task left for the teacher is not to sit and wonder whether to utilise the medium but to develop educational strategies and methods to make the most beneficial and effective use of it to attain the objectives.

### Conclusion

Video equipment are costly to operate and maintain. Tapes, recording and playback heads deteriorate after their normal life-span. Still, the videotape has added new dimensions to the versatility of television. Everything that a teacher has been doing all these years with cine film, he can now do with videotape. From our observations, videotape seems to be even more versatile: provides for multiple camera recordings and instant editing facilities are possible; playback is immediate and production process is far less complex and less time consuming. The time is not too distant when no educational resource centre is going to be complete without video recorders and an ample stock of pre-recorded programmes covering a variety of subject areas of interest to both students and teachers. The subject contents may vary from complicated laboratory experiments to the silkscreen printing process or even on the techniques of baton-passing in athletics. With an added advantage of dubbing programmes of importance in a simple and economical manner and together with other media materials the schools will be able

to set up a rich collection of reference materials at their institutional levels. In these modern times, utilisation of electronic machines has come to stay as a way of life and the educational importance of some of these machines is something which educators cannot ignore. It is hoped that the impetus and enthusiasm for the video cassette recorder will not wither away with time, but instead gather greater educational momentum and get to stay embedded in the day-to-day transmission of experiences and knowledge to the young and developing minds in the school classroom – that nursery of knowledge.

*(The authors gratefully acknowledge the assistance of Encik Tang Hon Yin, Pengelola, Perkhidmatan Sebaran Pendidikan, Jabatan Pelajaran, Pulau Pinang, in the preparation of this article.)*

### Notes

<sup>1</sup> Irving R. Merrill, "Television Capabilities and Instructional Efficiency." *Television in Health Sciences Education*, 1960.

<sup>2</sup> Alan Hancock, "Planning for Educational Mass Media. London: Longman Publishing House, 1977. pp-43-45.

<sup>3</sup> Fatimah Binti Ali, "The Utilisation of the Malaysian Educational Television," *Educators and Education*, Vol. 2, No. 1, January 1980, pp-62-78.

<sup>4</sup> Perkhidmatan Sebaran Pendidikan, "Projek Perintis Perakam Pita Video (VCR). *Kertas Maklumat No. 1 dan No. 2*, 1979 (Mimeographed)

<sup>5</sup> *Perkhidmatan Sebaran Pendidikan*, "Projek Perintis VCR," 1979 (Mimeographed)

<sup>6</sup> \_\_\_\_\_, "Projek Perintis VCR," 1979 (Mimeographed)

<sup>7</sup> \_\_\_\_\_, "Projek Perintis VCR," 1979 (Mimeographed)

<sup>8</sup> \_\_\_\_\_, "Projek Perintis VCR," 1979 (Mimeographed)

<sup>9</sup> Gordon, George N. and Falk, Irving A., *Videocassette Technology In American Educational* Englewood Cliffs, New Jersey: Educational Technology Publications, 1972. pp. 72.

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