EDUCATION ON DEMAND

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ABSTRACT

How can cable operators acquire higher visibility and first hand community involvement leading to a more positive image for a cable system? The answer is detailed in the following paper which describes the technology involved in providing an "Education On Demand" service to local school systems in a cable franchise area.

INTRODUCTION

Education in the classroom has changed dramatically over the years and continues to evolve today. Interactive learning systems, which have been available for more than ten years, are gaining wide-spread acceptance within the education community. Schools throughout the country that are using videodiscs for interactive educational training is the main reason this change has taken place. The advantages of videodiscs compared to traditional methods of teaching are overwhelming. The only disadvantage is the cost of the equipment per classroom.

The idea of Education On Demand overcomes this disadvantage by removing the individual equipment from each classroom and installing the equipment in a remote location at a cable system's headend or at a central location at the school. By installing the equipment remotely, the amount of equipment can be decreased and the equipment can be shared by every classroom. Specific teaching material and use of the equipment is then scheduled in advance. Not only can a single school have the use of the equipment in a local cable system, but an entire school system can schedule use of the interactive system.

EDUCATIONAL VIDEODISCS

The videodisc or laserdisc (the terminology is interchangeable) was first used in classrooms in the early 1980s. It has proven to be such a powerful method of teaching and learning that it has grown in popularity ever since. To support this popularity, production of videodiscs for educational use has increased from 275 different videodiscs in 1987 to approximately 2,800 titles produced by more than 275 different companies today. In a relatively short period of time, the

number of available educational videodiscs has skyrocketed as depicted in Figure #1.

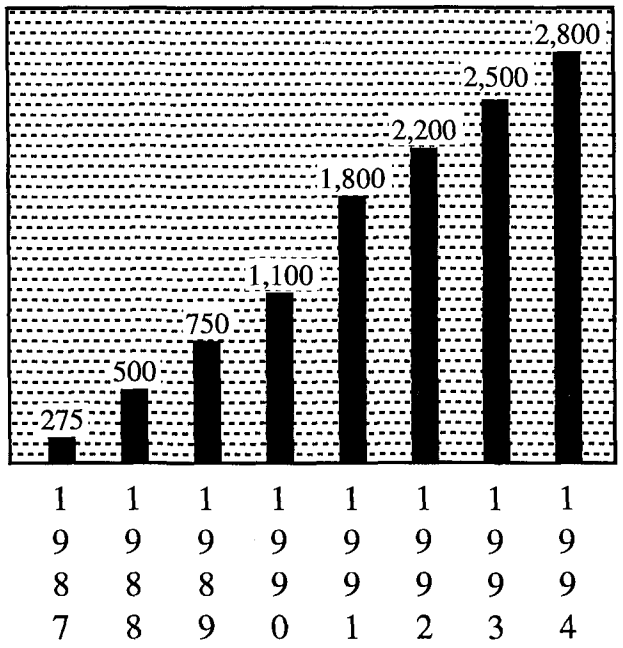

Figure #1 - Number of Educational Videodisc Titles

Educational videodiscs cover subjects including science and health (which are the categories that contain the most titles), geography, history, art, drivers training, mathematics, music, foreign languages, and even physical education. In addition, many videodiscs contain Spanish/English or French/English audio which is very useful in bilingual classes.

Videodiscs have many advantages over the traditional films or videotapes which are used in classrooms. For example, when a film or videotape is shown, the classroom is typically darkened and the instructor sits in the back. Using a videodisc player connected to a monitor or television, the room is not darkened and the instructor is usually in front of the classroom controlling the learning environment. Fast and random access to any specific section of a videodisc is available along with freeze frame, step motion, and slow motion; whereas, films and videotapes require time consuming rewinding and fast forwarding. Another advantage is that videodiscs are virtually indestructible and can be shown indefinitely. How many teachers have been frustrated by broken filmstrips while showing a film or videotape?

INTERACTIVE SYSTEMS

A typical interactive instructional system includes a videodisc player, a monitor or television, and either a remote control device, a barcode reader, or a computer to control the player.

The handheld remote control is probably the most cumbersome method of player control, because the instructor must enter the frame number of an image or clip to be shown.

Using a computer to control a videodisc player is presently being used in some classrooms, which is the most versatile, but costly.

Thus, the most popular interactive instructional system in use today controls the player using a barcode reader. A barcode reader simplifies the access method by reading barcode labels of the section to be played and sends the command to the player automatically. Also the instructor can produce their own barcode labels, which allows greater flexibility for personally designed lesson plans. An example of this type of interactive system is shown in Figure #2.

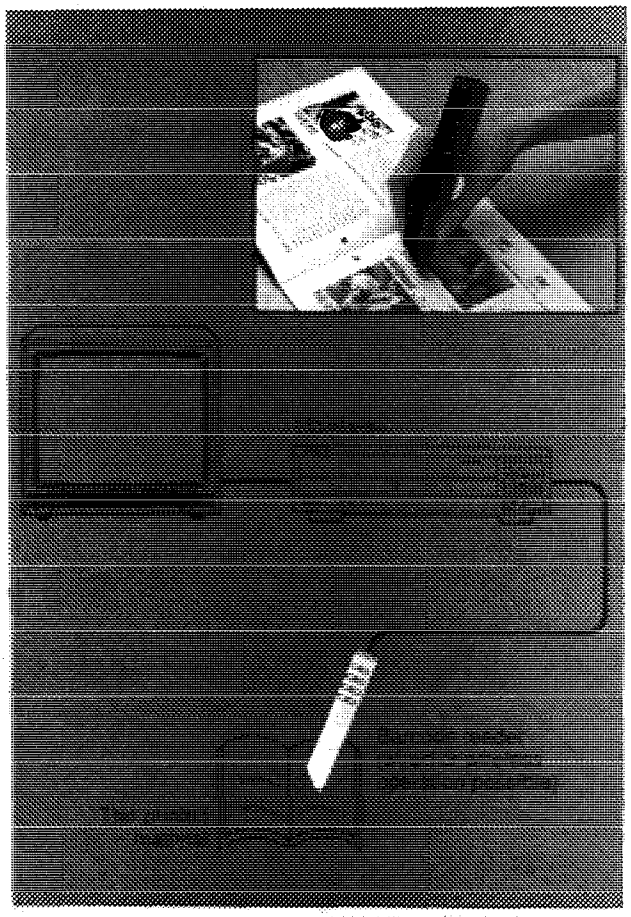

Figure #2 - Typical Educational Interactive System

Because videodisc players are so easy to use, the student instead of the instructor can become the operator. It is a proven fact that most people are visual learners. They grasp concepts and comprehend new ideas more readily if they are presented with something they can see and interact with. To support this claim, some textbook publishers are beginning to make use of the videodisc technology. Many publishers are inserting barcodes into their textbooks, and even including the videodiscs as part of the printed material.

If interactive education is the best learning tool available, why isn't it used in every classroom in every school? The answer to this question is cost. Federal and state funding, private corporate and individual donors along with the ever growing school district bond issues, cannot provide enough money to accomplish this goal.

EDUCATION ON DEMAND THE SOLUTION TO THE COST

To remove the cost of installing equipment in every classroom, the idea of Education On Demand (EOD) was born. EOD installs equipment for an entire school, or even a complete school system, in a single location at the school or at a cable system's headend. How will such a system work? The answer begins with cable. As of today, over

60,000 schools (61% of the 99,432 total schools in the U.S.) are provided with free cable services by their local cable companies. Four years ago a program called "Cable in the Classroom" was started and as Figure #3 shows, the number of schools connected to cable has increased an incredible ten times.

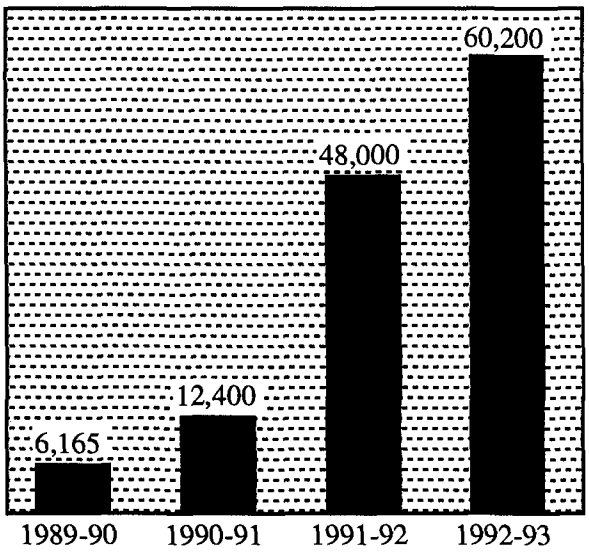

Figure #3 - Cable in the Classroom

With cable already in the classroom, the major obstacle of EOD is solved. The interactive classroom in the EOD system contains only a barcode reader and an IR transceiver. The barcode reader can be directly connected to the IR transceiver or the instructor can point the reader at the transceiver and send the barcode command. The IR transceiver then translates the barcode command and transmits the command over the cable system to the videodisc players in the cable system headend. The videodisc player responds to the command received and the classroom watches the result on the television.

Figure #4 depicts a very basic EOD system configuration. The 5 to 30 MHz path is the path on which the IR transceiver transmits the barcode commands. The type of path that is shown would be feasible only in a two - way cable system or if the equipment is located at the school.

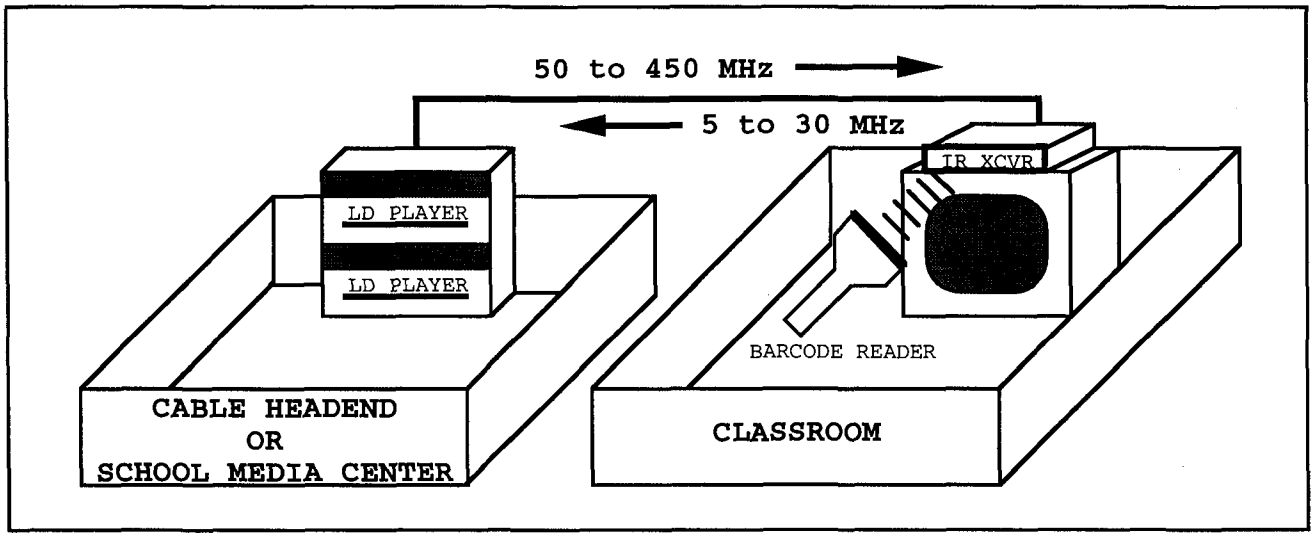

Figure #4 - Basic Education On Demand System

This return path would be accomplished using RF modems. For cable systems that are one-way, the return path can be via telephone modems. For the entire school only one modem or return path would be necessary, although multiple modems can be added for larger EOD systems.

The IR transceiver interface is a standard RS-232C type of interface; thus, common communication equipment such as A/B switches, modems multiplexors, and line sharing devices can be used to construct the return path

Figure #5 is an EOD system diagram that shows multiple classrooms connected to multiple players. To accomplish this an A/B switch is added to each classroom and then connected to a multiplexor (MUX). The A/B switch selects which LD player the barcode commands will control. The multiplexor is used so that multiple return paths are not needed.

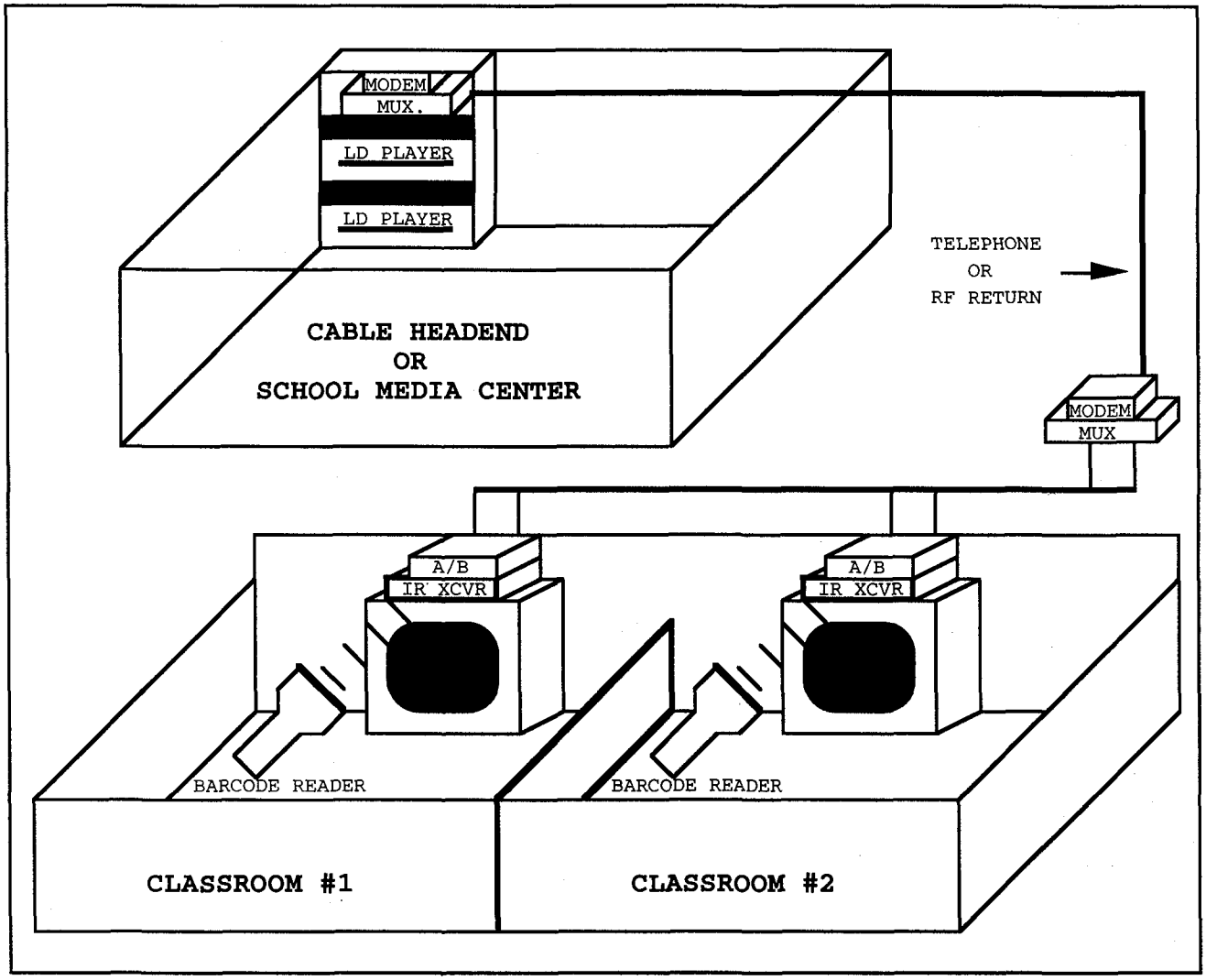

Figure #5 - Multiple Classroom EOD System

Figure #6 is an EOD system diagram that shows multiple classrooms connected to multiple players from multiple schools.

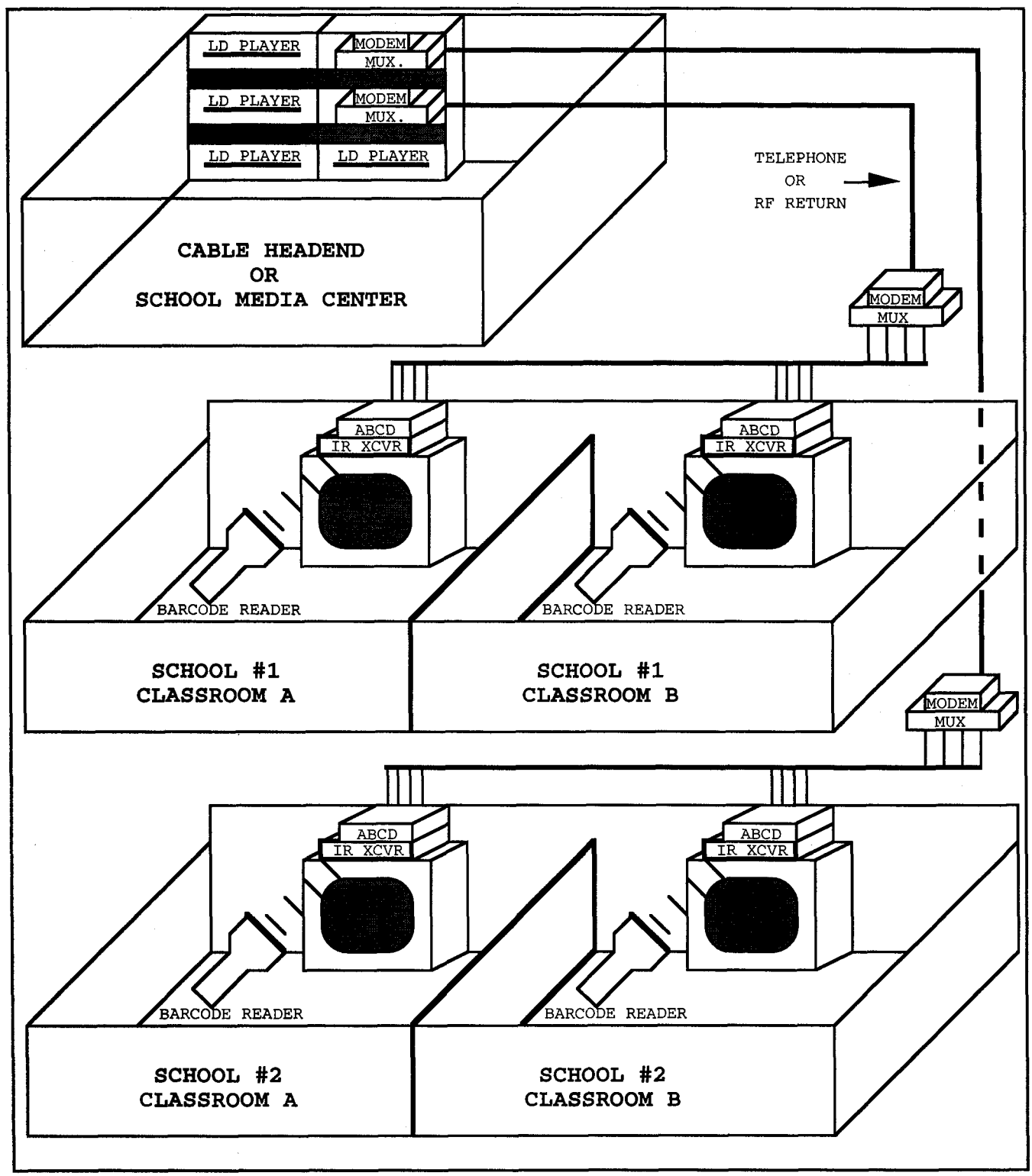

Figure #6 - Multiple School EOD System

With multiple schools the return path for each school must be separate. For a two-way cable system, this is done by offsetting each schools return path RF frequencies. For a one-way system, multiple phone lines must be used. Again, multiplexors and ABCD switches are necessary to allow access to any of the LD players from any of the classrooms. ABCD switches are used because four LD players can be selected for control.

Configurations for EOD are unlimited along with the number of videodisc players that can be controlled. Using multiplexors, ABCD switches, or line sharing devices allows multiple videodisc players from each classroom or from each school system to be controlled.

The only problem encountered with numerous players or multiple school access, is the scheduling of player usage. This problem is easily solved with the addition of a scheduling computer that automatically handles player usage. This scheduling computer can also contain a database listing any available educational videodisc in the system.

Not only can single videodisc players be connected to the cable network, but autochangers that can contain up to 72 different videodiscs can be connected. This piece of equipment truly makes EOD very versatile when configuring a system.

SUMMARY

Interactive learning systems are gaining wide-spread acceptance within the classroom. The advantages of reduced learning time, increased retention, flexibility in teaching style, ease of use, and probably the most important, the enjoyment of interactive learning, have led the way to further advancements in this type of training.

Education On Demand is an example of this type of advancement. Cable operators that install EOD systems in schools in their franchise areas, will benefit from higher visibility and an overall greater community awareness. Instructors will have a wide variety of current user definable information available that will allow flexibility in their teaching style. And most important of all, the student will gain the most by decreasing learning time and promoting greater information retention while having fun.

REFERENCES

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