Chapter 1

Introduction
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INTRODUCTION

Education is a process of human empowerment for the achievement of better and higher quality of life. It tells man how to think and how to make decisions. Training of a human mind is incomplete without education. Only through the attainment of education, man is enabled to receive information from the external world; to acquaint himself with past history and receive all necessary information regarding the present. Without education, man is as though in a closed room and with education he finds himself in a room with all its windows open towards outside world.

The imperative character of education for individual growth and social development is now accepted by everyone. Investment in education of youth is considered as most vital by all nations. “Education for all” is one of the solutions for the welfare of the nation and framework of plan of action to achieve the target. The World Conference on EFA (1990) states that every person, child, youth and adult should be able to benefit from educational opportunities, designed to meet their basic learning tools and learning content required to develop their full capacities.

Education is the knowledge of putting one's potentials to maximum use. One can safely say that a human being is not in the proper sense till he is educated. It is education that lifts people out
of the state of chronic poverty in which they are constantly struggling to fulfill basic needs. The truth is that all people have a right to have these basic needs fulfilled, and they also have a right to education.

Physical education and sports are the important areas in general education, which develops physical, mental, emotional, cultural and social aspects of human beings. The dictum “A sound mind in a sound body” and “Health is Wealth” are all accepted by one and all. Physical education is a necessity for the health and well-being of every student. As a unique and essential part of the total education program, physical education can significantly enhance all aspects of development including health, physical fitness, movement knowledge, academic performance, goal setting, self-esteem, stress management and social skills.

Physical education is generally associated with competitive sports or development of muscles or body building or military drill. Physical education is rightly recognized as integral part of Education. It is obvious that Physical education and Education should both work harmoniously in the total process of Education. Physical education should help to develop skills and attitudes, which will be conclusive to the wise use of leisure time, and provide opportunities for emotional control, living according to acceptable social standards and self expression.
Physical education is an educational process that aims at the human performance and enhancement of human development through the medium of physical activity selected to realize this outcome. Physical education is not only concerned with the physical outcomes that accrue from participation in activities but also disciplining the mind and spirit of an individual by learning and participation.

Since Physical education is an integral part of education, and the existence of man is primarily physical, the first lessons of a human child are arranged as the lessons of physical activity. No education, howsoever ideal and exalted in its objectives, is complete without emphasis on motor activity. The human body is a sacred gift of nature. Its growth, development and efficiency largely depend upon the quantity and quality of motor activity it performs. Compartmentalization of human personality into “body, mind and spirit” is an over simplification. The mind and spirit do not reveal themselves without body. The body, being on observable material cause of mind, is an instrument through which man performs all duties enjoyed upon him by nature and society. Adequate muscular activity is not merely a biological necessity; it is the basis of “intelligent behaviour”.

Teaching in Physical education helps to develop the physical abilities in general as it offered both in theory and practice
compulsorily. A person with sports background is usually admitted in the course with the mandatory entrance test comprising the practical component. It also envisages the intellectual and emotional abilities as a major subject of study. Any graduate is eligible to enroll in the course with the minimum participation in inter school level sports events. The kind of input in the practical besides their training routine and entertainment-cum-learning specialization disciplines make them fitting persons emotionally stable and intellectually powerful. These students undergo the courses of varied nature in the Physical Education major such as Anatomy and Physiology, Sports Psychology, Exercise Physiology, Kinesiology, Biomechanics, Sports Medicine, Sports Nutrition, Research Methods, Statistics, Computer Applications, etc. Students from the Humanities also are eligible to study these varied courses of the major considering the required output for the professionals. Irrespective of the difficulty level of course, a number of papers and practical activities of Sports Sciences are taught as core subjects and specializations. It is not uncommon that many students find it difficult to be attentive in theoretical inputs of Sports science based topics while enjoying their practical activities in the playground.

Exercise and Sports physiology have evolved from Anatomy and Physiology. Anatomy is the study of structure of an organism or morphology. From Anatomy, we learn the basic structure of various body parts and their interrelationship. Physiology is the study of
body functions. In Physiology, we study how our organ, systems, tissues, cells and molecules within the cells work and how their functions are integrated to regulate our internal environments. Because Physiology focuses on the functions of structures, we can't easily discuss Physiology without understanding anatomy (Wilmore and Costill, 1999).

Exercise physiology is the study of how structures and functions of our body are altered when we are exposed to acute and chronic bouts of exercise. Sport physiology further applies the concepts of exercise physiology to training the athlete and enhancing the athlete's sport performance. Thus, sport physiology is derived from exercise physiology.

With the increasing use of computers in the classroom and the advancement of information technology, a requirement to investigate and evaluate different strategies for the presentation of verbal information in interactive and dynamic visualizations has risen to a high level of importance. There is a need for research efforts that apply cognitive load theory, cognitive learning strategies, and established principles of multimedia design to conduct empirical research that will add to our knowledge of designing and developing dynamic visualizations for teaching and learning physiology. The impact of improved teaching and learning of physiological sciences and the development of a set of guiding principles to facilitate the
design and development of effective dynamic visualizations represent a significant achievement for physical education with wide application. This research work presents the foundations of cognitive load theory, cognitive learning strategies, and principles of multimedia design to guide the needed research on dynamic visualizations (Khalil et al, 2005).

The last 20 years have seen rapid technological developments within the field of information technology. The internet, sophisticated software packages and increased accessibility to computers have all opened opportunities for educators. Against this background, increasing numbers of multimedia learning packages in coaching are available to the physical education professional but for theory still to improve technology enhanced learning.

In recent years, numerous computer assisted learning programmes based on new teaching methods, as for example the principles of cognitive apprenticeship and problem based learning, have euphorically been developed for various fields. However, many of these programmes failed due to either low acceptance, economic inefficiency, or, most seriously, problems with the implementation and evaluation in curricula.

Modern research has broadened scientific knowledge and revealed the interdisciplinary nature of the sciences. For today’s students, this advance translates to learning a more diverse range of
concepts, usually in less time, and without supporting resources. Students can benefit from technology-enhanced learning supplements that unify concepts and are delivered on-demand over the Internet. Such supplements, like imaging informatics databases, serve as innovative references for sports information, but could improve their interaction interfaces to support learning. With information from these digital datasets, multimedia learning tools can be designed to transform learning into an active process where students can visualize relationships over time, interact with dynamic content, and immediately test their knowledge. This approach bridges knowledge gaps, fosters conceptual understanding, and builds problem-solving and critical thinking skills—all essential components to informatics training for science and medicine. Additional benefits include cost-free access and ease of dissemination over the Internet or CD-ROM. However, current methods for the design of multimedia learning modules are not standardized and lack strong instructional design. Pressure from administrators at the top and students from the bottom are pushing faculty to use modern technology to address the learning needs and expectations of contemporary students. Yet, faculty lack adequate support and training to adopt this new approach. The development of a multimedia module consists of five phases: (1) understand the learning problem and the users needs; (2) design the content to harness the enabling technologies; (3) build multimedia materials
with web style standards and human factors principles; (4) user
testing; (5) evaluate and improve design (Huang, 2005).

The primary motivation for integrating any form of education
technology into a particular course or curriculum should always be
to enhance student learning. However, it can be difficult to
determine which technologies will be the most appropriate and
effective teaching tools. Through the alignment of technology-
enhanced learning experiences with a clear set of learning objectives,
teaching becomes more efficient and effective and learning is truly
enhanced. Course websites function as resource centers and provide
a forum for student interaction. PowerPoint presentations enhance
formal lectures and provide an organized outline of presented
material. Some lectures are also supplemented with interactive
CD-ROMs, used in the presentation of difficult physiological
concepts. In addition, a computer-based physiological recording
system is used in laboratory sessions, improving the hands-on
experience of group learning while reinforcing the concepts of the
research method. Although technology can provide powerful
teaching tools, the enhancement of the learning environment is still
dependent on the instructor. It is the skill and enthusiasm of the
instructor that determines whether technology will be used
effectively (Griffin, 2003).
There are at least three areas in which technology can impact education: teaching, learning, and assessment. Teaching, when viewed as communication of information, has been transformed by the technology revolution. Word processing, multimedia, distance learning, and access to the World Wide Web are some prominent examples. The impact of technology on learning, defined as knowledge or skill acquired by instruction or study, has been less dramatic, in part because of our limited understanding of cognitive processes. Some forms of assessment, the collection of evidence of learning, have benefited from technology, such as item analysis of multiple-choice questions. To be effective, the focus on instruction must start with the learner and, from there; consider what should be done to enhance learning. An emphasis on what is technologically appropriate, rather than what is technologically possible, will improve the quality of both teaching and learning (Carroll, 1998).

The discipline of Exercise physiology is challenging to teach. It has ill-defined boundaries and no agreed sequence for learning; students' needs depend on the goals of the specific degree programs in which they are enrolled. Internationally, it is taught under many different conditions, using a range of strategies, to a wide variety of groups. All teachers are subjected to local constraints and the availability of resources. Newer educational methods emphasizing active and integrated learning provide novel challenges. Particular difficulties in teaching arise for some when they are not themselves
broadly educated in Exercise physiology and related disciplines and for others when they have only limited access to update the knowledge and resources. Sessions and workshops on modern Exercise physiology and educational issues are included in national, regional, and international conferences at which the participation of teachers is encouraged and supported. However, the accurate strategy of teaching ‘Exercise physiology’ is still a dream and when it is taught for different purposes, learners find understanding the subject more difficult (Sefton, 1998).

Educational technology is a system in education in which machines, materials, media, men and methods are interrelated and work together for the fulfillment of specific educational objectives. Technology explosion has yielded several new machines, materials and media, which have great potential for use in the educational enterprises. A judicious use of these together with new functions and roles of educational personnel can bring about more efficient and effective teaching and learning. An adequate knowledge of theory and practices of educational technology and their proper use would enable the teacher to understand and effectively discharge his new roles in the educational system in the age of information explosion, knowledge explosion, popular explosion, and expectation explosion. There is considerable hope and some positive evidence that technology can expand and improve education at all levels with
special reference to the design and content of instructional materials, delivery, assessment and feedback (Jeganath 2003).

Development and use of the educational technology is relatively a recent educational phenomenon. In the pre-industrial phases, the instructional process relied heavily upon simple things like the slate, the hornbook, the blackboard, and the chalk. It was limited to a single textbook with a few illustrations. Educational technology was considered synonymous to simple aids like charts and pictures.

The first stage of educational technology is linked with the use of audio-visual aids like charts, maps, models, specimen and concrete materials. The term educational technology was used as synonym to audio-visual aids. It is said that good teachers have always used visual aids to make their teaching effective.

The second stage of educational technology is linked with the "electronic revolution" which brought an era of sophisticated hardware and software. The projector, tape-recorder, radio and television changed the educational scenario. Accordingly, educational technology was taken in terms of these sophisticated instruments and equipments for presenting instructional material.

The third stage of educational technology is linked with mass media, which led to "communication revolution" for instructional purposes. Computer Assisted Instruction also became popular. The
individualized process of instruction marks the fourth stage of educational technology. The invention of programmed learning and programmed instruction gave a new dimension to educational technology. A system of self-learning based on self-instructional materials emerged with the advent of computers.

The last 20 years have seen rapid technological developments within the field of information technology. The internet, sophisticated software packages and increased accessibility to computers have all opened opportunities for educators. Against this background, increasing numbers of multimedia learning packages are available in all the disciplines.

We are moving into an information age. More and more, technology will shape the way we do our work. With the information age and computers becoming more prevalent in work and play, it is important for schools and colleges to be prepared to manage technology in their facilities. For many people getting involved with Multimedia, Internet, and new ways to deliver education will be the most exciting and rejuvenating experience of their professional lives. The public is keeping abreast with the technology changes. More than ever, individuals value the importance of technology changes in education. In recent years, numerous computer assisted learning programmes based on new teaching methods, as for example the
principles of cognitive apprenticeship and problem based learning, have euphorically been developed for various disciplines.

A series of components, including the collection of public and private high-speed, interactive, narrow and broadband networks that exist today will emerge tomorrow. It is the satellite, terrestrial, and wireless technologies that deliver content to homes, businesses, and other public and private institutions. It is the information and content that flows over the infrastructure whether in the form of databases, the written word, a film, a piece of music, a sound recording, a picture, or computer software. It is the computers, televisions, telephones, radios, and other products that people will employ to access the infrastructure. It is the people who will provide, manage, and generate new information, and those that will help other do the same.

The computer is a machine which processes the raw data and converted into meaningful data. It can do a large number of tasks very quickly. If a person has a problem that involves a large amount of calculation of the cross reference of a great deal of information then he can PROGRAM a computer to aid in his search for a solution. It can store large amount of data and work at an impressive speed. It provides an output of its work in several ways on a screen like a television receiver, in print like a typewriter, or in pulses of energy for transmission over communication channels. But
a computer is an electronic device that can do only what people tell it to do. It is a tool of many capabilities useful for a multitude of purpose—including instruction. In classroom, in media centers and libraries, in computer workrooms, and at home, students are using microcomputers for recreation and for learning (Alexis, 1999).

Educational historians would describe the last three decades of the twentieth century as the computer era in education. The second half of the present century saw the strengthening of the technological advancements in education. This movement assumed a new shape when it adopted one of the most important tools of technology—computers to augment the quality of its functioning. The potential of the new tool was such that it not only dominated and controlled other technological devices, but also emerged as the most important force governing the operation of the entire process of education.

Computer has helped to increase the efficiency of the human mind several fold. As such, it has helped to improve human efficiency in different human endeavours, including education. The diverse roles that computers can play in the field of education are best illustrated in certain facets of education where computers have already been put to use. Following are some of the technological features commonly available in a computer managed teaching learning environment.
In physical education and sports, computer technology has got different applications to perform. Computer technology imports knowledge in health, physical education, recreation, and dance in the areas of research, classroom teaching and coaching. While the overall effect is not yet fully assessable, the presence of technology in so many different aspects of the profession makes it important to more clearly recognize and appreciate its current and potential role (Joseph, 1987).

Physical education professionals need to perform an inventory of training hardware and software available within their own organizations. Modern trends and perspectives include new patterns of sports management, recent concepts of leadership, developments in facility construction, innovative ideas for teaching, problems in sports and games, international relations, community school operation, changing pupils' interests and need and system analysis. Innovations in programming, recent psychological advance and the use of computers, televisions, internet and other technological aids are the items demanding attention to be introduced and widely used in the field of physical education and sports.

Computer Assisted Instruction (CAI) provides students with an alternative to classroom settings. Mohnsen (1995) identified a number of reasons for using CAI in physical education. Among them were suggestions that CAI provides students with the "why" behind
health-related fitness; it provides unlimited practice, review and remediation; students stay actively involved; and it meets a variety of student needs. CAI, if individually developed, requires considerable time on the part of the instructor, but this is compensated for by increased learning time available in the classroom. Students can be exposed to a video of a working heart and even create specific heart problems. Students may see a working heart with a dynamic chart that illustrates heart efficiency. Students can take notes and copy the pictures to a notebook that is built into the program and, when done, can download and print the notes.

Multimedia is the use of text, pictures, audio, and /or video to deliver information. Multimedia is a technology of content, applications and people. It encompasses many concepts and ideas that are important to understand. Multimedia Courseware is an electronic collection of multimedia-rich learning materials combined with varying levels of tutorial interactivity, which can be independently accessed by learners at any time and used at their own pace. Courseware can be made available on CD-ROM, over an intranet or through the Internet (Gold, 1991).

Students learn in different ways and some find a visual learning environment more helpful than a purely textual one. A courseware has the capacity to provide a visual and audio context for student learning, enhancing the more conventional textual
format. Courseware is not a substitute for existing course teaching but can be used to supplement lectures or cover basic material in preparation for more advanced classroom discussion. It can provide a quality controlled and resource rich learning environment for students to engage in knowledge acquisition, testing of understanding and the practice of research. Research studies suggest that students find courseware valuable both for instant formative feedback and for revision purposes.

Software standards for digital media and instruction are intended to ensure that courseware will be developed, organized, and distributed in a uniform manner. Some of the reasons why standards are needed are termed the "ileitis". They include interoperability among different systems connected by the Internet, accessibility of the content anytime from another location, reusability of content by other developers to save time and money, discoverability of content located in repositories using metadata, extensibility of existing courses due to their modular construction, affordability due to reduced development costs, and manageability of the content by allowing easy changes and updates to small chunks (Computer Education Management Association, 2001; Singh, 2000).

One concept underlying the evolving courseware standards is that the same instructional content may be usable in different
instructional contexts. Therefore, instructional content designed as context-independent chunks in an object-oriented programming environment can be shared with other users, recombined with other objects, or redesigned by other instructional developers with reasonable expectations of cost savings (Merrill, 1998; Reye, 1996).

Students, parents and education experts are calling on higher education to find new and more effective ways to teach. In one of the research studies, Virginia Technology University has identified that technology centers around computers and other sophisticated equipment. Scholars can communicate by computer across campus, or they can call on information and experts from around the world. In a class, students are discovering new ways to approach problems, are more excited about their courses, and are learning more and absorbing it faster.

Music professors who used to plink out a tune on a piano while trying to teach, and Science teachers who tried to explain a difficult concept using two-dimensional photos, use computer to enliven their lectures. English and Humanities professors report that students write about 50 percent more than students who do not use the computer as extensively. Calculus professors who teach by computer are able to move students quickly past long, laborious hand calculations and into more advanced concepts.
Physical education is an essential and integral part of the total education program and makes significant contributions toward the achievement of desirable education and health outcomes through the medium of physical activity. Quality physical education programs promote the physical growth and development of children and youth while contributing to their general health and well being. They are based on a planned sequence of experiences in a wide variety of activities beginning with basic movement skills and progressing toward more complex sport, dance and other forms of movement. Ultimately, they should help young people keep physically fit and enjoy many forms of physical activity during the school years and continuing throughout life.

We envision students moving efficiently, enjoying physical activity, developing physical fitness and pursuing wellness as a part of lifelong learning. Therefore, we believe that physical education is an integral part of a comprehensive education and must be included on a daily basis. Finally, it should be understood that quality physical education is predicated upon having competent, dedicated, and knowledgeable teachers who utilize appropriate instructional techniques, strategies and assessments.

Physical educators need to make use of the latest computer technologies when promoting their programs. Establishing a CD - Rom with animation, Images and interactive for all Physical
Education program is an effective way to provide factual and in-depth information. The greatest value of multimedia may reside in the ability to provide improved support to classroom instruction. More often than not, the appropriate instructional strategy is not included in the use of software. However, there will be times when instructional software is appropriate, depending on the learning styles of the students and the content of the lesson.

New technology may create additional opportunities for learning in Physical Education. One of these new features is a multimedia approach courseware combining sound, text, stills and video with interactive learning.

**Need for the Study**

A vision for education was cultivated to guide school and college systems. A greater dependence on new communication and computing technologies support new levels of student creativity and research. A change in the role of teachers is witnessed from "sages on the stage" to mentors, researchers, publishers, technology users, knowledge producers, risk takers and lifelong learners. Involvement of parents plays a major role in the education of their children and to work actively with teachers to connect formal and informal education. The modern world warrants the teachers to imbibe new skills such as abilities to quickly adapt to new situations and new
technologies and to be able to process best amounts of information required in an info-society.

The problem is that some students find theory in physical education a boring one, with a huge amount of new vocabulary. It typically starts with Kinesiology, rushes through Biomechanics and Sports Medicine, and tries to distinguish between Anatomy and Physiology, and Sports Psychology, Training Methods and so on. Many of the (sophomore) students lack the study skills to abstract the important ideas in a lecture or chapter, organize the information into a coherent whole, and then access that knowledge as required on tests. They therefore pursue some entirely different method of teaching via technology and are succeeding in removing the problem of students. One was a clear mismatch between the way the material was taught (by conventional chalkboard lectures to large sections—typically 50-150 students) and the way the textbooks presented the information (lots of pages of detail that really challenged the students to figure out what was important), and the way that the students were actually prepared to learn. Words, either spoken or written, do not communicate ideas as well as images. Static listening to lectures or reading the textbook requires the students to build these images in their mind, and only the best few can really do this for themselves. The most successful courses involve hands-on laboratories in which students can explore and experience things for themselves, and take an active part in the learning process.
Multimedia are more than high technology buzzwords- it is powerful way to educate, entertain, and inform. It has taken the computer from communicating information as text to telling stories using pictures, sound and video. Multimedia has taken computer users from intimidating mainframe terminals to high-technology desktop systems that offer fun, adventure and interactive learning. Multimedia technology is one of the main reasons, computers are becoming as common in the home as they are in the workplace.

Multimedia and CD-ROM technologies may be considered to represent the second wave in educational technology, taking advantage of technology developments in computers, communications and consumer electronics; the first wave may be considered to be the technology developments in audio, video and TV media, which occurred about 20 years ago. The first wave raised high hopes of the new technologies revolutionizing the teaching-learning practices worldwide, it was even suggested that they would make teachers superfluous. Very soon, the euphoria disappeared and the teacher regained his pre-eminent position, although with a changed perception of his role and responsibilities and of the students’ needs. It is no wondered therefore that educators have been rather cautious in advocating the use of multimedia technologies in education. The role of the teacher is not threatened, and the new technologies are only considered as adjuncts that complement the classroom processes.
The Present Study

The present study aims at developing a multimedia courseware in teaching Exercise Physiology for physical education students and finding out the effectiveness of the developed multimedia courseware. The multimedia courseware meets the requirements of individualized learning. In the present study, individualized learning is integrated together in each instructional session of three major blocks namely, cardiovascular system, Respiratory system and Exercise on Cardio respiratory system.

Statement of the Problem

The purpose of the present study was to develop multimedia courseware in teaching exercise physiology for physical education major. The study consists of two parts. The first part of the study was to develop multimedia courseware in teaching selected units in exercise physiology for physical education major and the second part of the study was to find out the effectiveness of developed multimedia courseware.

Delimitations

The following were the delimitations of the study

1. The study was delimited to selected units of Exercise Physiology only to prepare the multimedia courseware.
2. In Exercise Physiology, the following units namely cardiovascular system, respiratory system and exercise on cardio respiratory system were selected for developing the courseware.

3. The preparation of multimedia courseware was used only for teaching the students in physical education major.

4. Only twenty students were randomly selected as subjects from Dr. Sivanthi Aditanar College of Physical Education, Tiruchendur, TamilNadu, studying Master's degree in Physical Education during the academic year 2004-05.

5. The selected subjects were taught with the help of Multimedia courseware on the selected units of exercise physiology. English language was adopted to prepare the multimedia courseware.

6. The learning achievement was selected as dependent variable and teaching exercise physiology through multimedia courseware was considered as independent variable.

7. Fifteen working hours were given for the subjects as learning hours. The subjects were tested thrice. Pre test was arranged before the experiment, the post test I was conducted after nine days and post test II was done after fifteen days on the learning achievement.
**Limitations**

1. Non-availability of reference materials especially in the software area in the Indianised version was considered as a limitation.

2. The previous knowledge of students in the field of Exercise Physiology was not considered.

3. Though the subjects were motivated verbally, no attempt was made to differentiate the motivation level during the period of courseware and testing.

4. Knowledge and experience of the researcher in the field of exercise physiology was not considered.

5. Availability of computer configuration, lack of expertise in the area of technology and computer of the researcher.

**Hypotheses**

1. It was hypothesized that the multimedia courseware module of teaching in the selected units of Exercise Physiology would have better effect on learning achievement of the subjects.

2. There would be significant difference among the Pre test, Post test I and Post test II on learning achievement of selected units in Exercise Physiology.
Definition and Explanation of the Terms

Computer

Computer is an electronic device, which can automatically accept and store input data, process them, and produce output results by interpreting and executing programmed instructions (Pradeep, 2003).

Multimedia

Multimedia refers to transmitting of information to the pupils through audio and video devices rather than hierarchically from the teacher.

Multimedia is defined as more than one medium used in a single communication either sequentially or simultaneously (Pradeep, 2003).

Computer Assisted Instruction (CAI)

Educational material comprising the software, documentation and other media resources were explored with computer. It also refers to the teaching materials used in educational computing. It may be contrasted with hardware and software.
Courseware

Courseware is an electronic collection of multimedia-rich learning materials combined with varying levels of tutorial interactivity, which can be independently accessed by learners at any time and used at their own pace. Courseware can be made available on CD-ROM, over an intranet or through the Internet. Some writers use the term more specifically to mean computer aided instruction (CAI).

Physiology

Physiology is the science, which deals with the study of functions of human being (Powers, 1997).

Exercise Physiology

Exercise physiology is the study of how our bodies’ structures and functions are altered when we are exposed to acute and chronic bouts of exercise (Wilmore and Costill, 1994).

Significance of the Study

1. There are various uses for technology in Physical Education besides the assessment and instructional functions. It is a great resource for communication and understanding of curricular content.

2. Computer based teaching offers a great deal in terms of broadening the curriculum and tapping into a creative way for learning and communication to occur.
3. The use of more technology in the classroom or on the playing field by physical educators would not only help them to keep up with the changing times, but also add a learning tool to the classroom setting.

4. We know that successful technology-rich schools and colleges generate impressive results for students, including improved achievement; higher test scores; improved student attitude, enthusiasm, and engagement; richer classroom content; and improved student retention and job placement rates.

5. Similarly, instead of reading about the human circulatory system and seeing textbook pictures depicting blood-flow, students can use technology to see blood moving through veins and arteries, watch the process of oxygen entering the bloodstream, and experiment to understand the effects of increased pulse or cholesterol-filled arteries on blood flow.

6. Technology acts as a catalyst for fundamental change in the way students learn and teacher teaches.

7. Students become re-energized and much more excited about learning resulting in significantly improved grades. The drop out and absentee rates decrease dramatically.

8. Teachers can and will embrace technology, if they are given the kind of professional development and support they need.
Scope of the Study

Education technology has been found to have positive effects on student attitudes toward learning and on student self-concept. Students felt more successful in school, were more motivated to learn and have increased self-confidence and self-esteem when using computer-based instruction. This is particularly true when the technology allows learners to control their own learning. The level of effectiveness of educational technology is influenced by the specific student population, the software design, the teacher’s role, how the students are grouped, and the level of student access to the technology.

Students trained in computer-based learning had higher self esteem and student achievement. Introducing technology into the learning environment has been shown to make learning more student-centered, to encourage cooperative learning, and to stimulate increased teacher/student interaction. Positive changes in the learning environment brought about by technology are more evolutionary than revolutionary. These changes occur over a period of years, as teachers become more experienced with technology.

Many students who seldom participate in face-to-face class discussion become more active participants online. Greater student cooperation and sharing and helping behaviour occurred when students used computer-based learning that had students
compete against the computer rather than against each other. Technology can motivate students to attempt harder tasks and to take more care in crafting their work. Technology implementation often stimulates teachers to present more complex tasks and material. Introduction of technology will tend to support teachers in becoming coaches rather than dispensers of knowledge. Technology use increases teachers' sense of professionalism and achievement.

Positive effects have been found for all major subject areas, in preschool through higher education, and for both regular education and special needs of students. Evidence suggests that interactive multimedia is especially effective when the skills and concepts to be learned have a visual component, and when the software incorporates a research-based instructional design. Use of online telecommunications for collaboration across classrooms in different geographic locations has also been shown to improve academic skills.

**Summary**

In Educational Technology (ET) and Technology Enhanced Technical Education (TETE), the role of the teacher will be expected to be quite different from what it is in traditional classroom teaching. In the latter the teacher is the author, playwright, actor and director,
with the actor's role assuming the major significance; while in the former, he will be more of a director and a coach/facilitator. One of the principal distinctive features of the new ET/TETE system will be the opportunity provided for individualized, self-paced learning, which caters to the individual abilities and aptitudes of the individual learners, and the possibility of one-to-one interaction with the teachers. This will also offer better opportunities to provide feedback and permit effective assessment of learning.

Studies on the theories of learning have demonstrated that more than one sensory channel dramatically improves comprehension and learning. The following hypothesis appears to be largely indicated; "I hear and I forget; I see and I remember, I do and I understand". Multimedia tools incorporate the above-mentioned features, and hence have the potential to result in optimal learning.

The purpose of this study is to make physical education program as an effective one through introducing multimedia courseware in classroom teaching. It is hoped that the multimedia courseware will provide useful ideas that can be implemented in a variety of settings. The multimedia courseware would prevent rote memory and enhance learning process. Comprehending the given problem and acquiring skills through multimedia courseware is quite challenging. This felt need is realized in this study.