Chapter 3
Methodology for Using Multimedia Package

3.1 Multimedia - Definition and Major Characteristics

Information a precursor to knowledge is available in various formats—text, pictures, audio and video. In order to convey the information content effectively, all the formats of knowledge need to be exploited. This combination of all the media is termed as, Multimedia Technology. As can be inferred very easily, by using Multimedia Technology almost every aspect of information can be dealt with.

There are many prefixes which are commonly used with the word media such as Multimedia, Electronic media, Interactive media etc. But the most common word which is used in education is multimedia. Multimedia is a combination of text, audio, video, graphics, and animations into a single medium.

“This technology comprises itself different types of interational forms such as print, radio, television, animation, photographs etc. Integration of different media multiplies the impact of a message.”

“According to research reports by Mayer and McCarthy (1995) and Walton (1993), “Multimedia has gained acceptance with many benefits derived from its use. Learning gains are 56% greater, consistency of learning is 50-60% better and content retention is 25-50% higher.”

“The means of communication is called media”

1. www.wikipidea.multimedia.com
2. www.cemca.org/emhandbook/section 5/page-32
3. Dennis, P. Curtin. Information Technology Page-216
Definition

“The term multimedia can be used as a noun to describe any medium that is having a number of content forms. It includes a cluster of text, audio, still images, animation, video and interactivity contents forms and is being used in contrast to media. Whereas the term media only describes contents in the traditional form of material which are produced by hand and printed.4

“Multimedia is commonly recorded and played through processing device such as computer, laptops, mobile or other electronic devices. But it is also being used in live performances. It is also used to describe electronic media devices which are used to store and experience the various multimedia contents. Having a broader scope, it is different from the mixed media in fine art as it includes audio.”5

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4 Muthuchamy, I., and Thiagi, K. Technology and Teaching Learning Skills., p-40
5 Ibid. P- 41
The term “Multimedia” recurrently is heard and recited through instructional technologists today. But to substitute it is to define in an alternative view point such as:

- Mixture of various information media like text, audio, and video.
- The evolution of hardware and software contents based on computer, composed on a very large scale prior to yield an individual to use and learn.

The most important quality of multimedia is that it incorporates miscellaneous level of acquiring knowledge in informational instruments which permits for the diverseness in educational presentations.”

Media word is the plural of ‘Medium’ which is used for communication. Usually the word ‘Media’ talks about newspapers, magazines, radio, telephone, and television. When the mode of media combines with the text, sounds, graphic art, animation and video elements, it results in the interactive way of communication. There are number of multimedia forms which are used as main mode of media such as Multimedia, Interactive media, Electronic media, Internet media and Print media. But now a day’s most commonly used way of education is multimedia.

“Multimedia is a combination of different media’s like text, audio, video, graphics, sound and animations, it combine them all into a single medium. This technology comprises of different types of interactional forms such as print, radio, television, animation, photographs, sound etc. Combination of all types of media multiplies the impact of a message.”

“A multimedia can become interactive media when an end user that is the viewer of a multimedia project controls when, what and how of the elements, which are being delivered and presented. In modern world multimedia is combining the various contents like text, audio video graphics

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6 www.cemca.org/emhandbook/section2 p-3
7 www.wikipidea.multimedia.com
animation together very carefully and thus it’s also helpful in interacting with these different media forms.”

As an alliance of no. of media contents like audio video graphics text animation etc, are put into one collaborative and collective form. It gives advantage to the viewer of more than any one of the media element available separately.

“In the late year 1970 people started using the term multimedia to describe presentation which were timed with an audio track , the multimedia than attained its current meaning by the year 1990”

“In 1990 the computer were being marketed by having CDR to deliver video pictures and audio data so these computers were called as multimedia computers. At the time the term multimedia was being commonly used as combined media like audio text video which was delivered electronically.’

**Major Characteristics of Multimedia**

- Multimedia presentations may be looked at by person on stage, projected, transmitted, or can be played locally with a media player.
- A transmission of multimedia presentation may be live or could be recorded. Transmission and recordings can be either digital or analogue electronic media technology.
- One can download digital online multimedia or can be streamed. This Streaming multimedia can be on-demand or live Multimedia games and simulations may be used with exclusive effects in a physical environment, in an online network, with diversified users; it can also be used at offline mode, game system, or hosier.
- The differing layout of methodological or digital multimedia may be destined to embellish the users' empiricism, for example to convey

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8 www.cemca.org.com/emhandbook/section2 Page no. 4
10 http://en.wikipedia.org/wiki/Multimedia)
information it is made accessible and faster in entertainment or art, to surpass experience on daily basis.

- Enlarged levels of interactivity are being made possible by joining assorted forms of media content.
- Online multimedia is becoming object-oriented to a great extent and data-driven, which enables applications with synergetic end-user modernization and embodiment on many forms of content over time. These Examples are the various mixed forms of media materials available on the numerous internet websites to counterfeit whose co-efficient, events, demonstrations, animations or videos are changeable, and that allows, the multimedia "experience" to be amended without reprogramming.
- Besides seeing and hearing, with the help of hepatic technology virtual objects can be felt. Emerging technology which involves deception of taste and smell can also improve the multimedia experience.”

3.2 Use of Multimedia package in the learning process

Now a day, Multimedia are extensively used for education and training in schools, businesses, and the homes. Multimedia education allows you to enhance your abilities at a faster rate and helps the students to be more confident. The presentations can be presented with a more interactive way by adding sounds, images, movies, animations, different text fonts, etc. It helps the presenter to connect themselves with the listener with more interactive ways.

The use of multimedia has offered a wide variety of ways for delivering the information. It makes the study more interactive by the addition of images, sound, animations etc. Interactive multimedia learning is a process that provides the new learning era for the user to implement their potential.12

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11 http://en.wikipedia.org/wiki/Multimedia
12 Luann, K. Stemler. Journal of Educational Multimedia and Hypermedia, Volume 6, p-6
Introduction of different multimedia assets makes the learning process more goals oriented, effective, fun and friendly.

- It makes the learning activity more fast and interesting.
- The programme never asks for a raise the more you use it, the less it cost per use.
- No mood swings, yawns, or lapses.
- Ask what you want, no one will laugh, no one will scold.
- Experience nuclear meltdown without fallout, experience drunken driving accidents or electrocution without blackout or death.
- It’s never tires of praising and motivating through positive feedback and boosts the moral.
- It is a strong foundation on which to build mastery.
- It is a tool to make a remembering, longer, easier – Many parts of the brains are stimulated.
- More information faster – Few things, like space, shuttle repair, brain surgery, black hole sailing etc. can be studied in a more interactive and natural way.
- Like a game, like in which with a joystick and screen has already captured the brains and fingers of an entire generation. Using multimedia tools with education provides the students with an opportunity to represent and express their prior knowledge.  


- It helps the students to act as designers; they can represent their knowledge in more represent able way.
- Tools can be used for analysing the world, accessing and interpreting information and representing what they know to others.
- It provides valuable learning opportunities to the students that can boost up their moral.
- Usage of multimedia empowers the students to create and design the ideas, rather than absorbing the representations created by others.

- Addition of multimedia encourages deep reflective thinking among the students.

- It creates the meaningful learning opportunities for the learners.\(^ {14}\)

**Figure 3.2**

Advantages of Multimedia Technology

![Diagram](image)

Through the research it's verified that the method of remembering the items within the human brain is quicker once individuals receive several emphases in numerous forms for a brief amount. The ideas of interactivity in transmission facilitate the human brain to enhance the method of learning. Additionally, totally different approaches of multimedia create lessons terribly amusing besides giving info more effectively and quicker.

Multimedia education has been proved to be more effective than traditional printed material because the dynamic and interactive settings are more expressive in presenting abstract concepts and can inspire creative thinking and engagement. After observing the additional of many students to

\(^{14}\) www.tech4learning.com
playing videos and online games, research studies suggest that curriculum contents embedded in a game like environment enhanced with acoustic and visual effects can be an effective tool for attracting students to learning.\textsuperscript{15}

Few things should be kept in mind while using the multimedia materials.

1. Teachers must be skilled enough to conduct the multimedia teaching to the students in a proper and confident way.
2. The teaching aids should be effective and the material used must be related to the topic.
3. Use of the multimedia materials should be only as means they should be justifiable. Thus the material used should be used very efficiently.
4. Should be capable in development in the children interrupt priority and their promotions the child may become, effectual.
5. Unnecessary accessories should not be taken.

3.3 General Requirements for Multimedia Package

Multimedia consist of two important assets Hardware and software. With the help of these two components we can represent the idea in a more interactive way. As multimedia is the combination of text, sound, images, animations, all these things required more space, memory and procession power as compared to the material that contain only information in the form of text.

There are number of applications that help the user to represent the information with more visual effects, it helps the learner to understand the concept in a more elaborative manner.

Multimedia Hardware

Hardware in multimedia refers to the physical requirement of the computer. It is a most important component of the multimedia to work with the

different projects. To deal with this you must have a computer with very basic needs i.e. hardware parts.

“Hardware helps in interpreting your commands to the computer. Hardware part of the computer basically divided into main components like: System devices, input devices, output devices and memory and storage devices. System devices include microprocessor, motherboard and memory. Input devices include Keyboard, mouse, microphone, digital camera. Output devices include monitor, printer. Memory and storage devices include RAM, floppy disk, hard disk, compact disk”. ¹⁶

Figure 3.3
Contents of Multimedia (Hardware)

¹⁶ www.cemca.org.com/emhandbook/section3 page no.10
A well organised multimedia system ought to have following hardware parts:

- Pentium 1.6 GHz (or the one with similar capabilities) onwards processor
- 256MB of RAM
- 17” onwards SVGA monitor
- 32 MB AGP card
- 52X CD-ROM drive
- a 32 bit sound card
- high wattage sub-woofer speakers
- 104 PS/2 keyboard, PS/2 mouse
- 56 K fax data voice modem

Multimedia software

Multimedia systems are providing promising differences by delivering the learning materials that are more convenient and less expensive. Any learning process must be designed in such a manner that the learner feels themselves engaged and connected to the subject matter. The systems should hold the relevant data to showcase their ideas. Multimedia is mostly now a day’s used for the purpose of education.

This can be proved after considering the growing use of graphics, illustrations, animations and sound in today’s educational multimedia system. So it is important to select the software that helps you to implement the project in minimum possible efforts and maximum possible productivity. Multimedia software provides unlimited features. With the help of different features one can make the presentation more interactive, there are several hundred of colours, dozens of fonts, and a wide variety of colour-coordinated templates and many other incredible options present in the market.
There are a number of educational software’s which are basically designed for the education purpose. Software can be categorized in two different ways, Audio software and video software. Also there are varieties of software tools available like sound editing tool, Image editing tool, Animation video tool, drawing tool etc. These entire tools give a wide range of templates to create the effective learning process. Below is the list of few software packages present in the market:

- Adobe CS4
- Adobe Dream weaver
- Adobe Firework
- Gimp
- Microsoft FrontPage
- Photoshop Pro
- Microsoft PowerPoint
- Adobe Flash Player
- Google Sketch up
Table 3.1
Salient Features of Multimedia Software

<table>
<thead>
<tr>
<th>Features</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serviceability</td>
<td>Software should be capable to accord with a array of text, images, sound formats and videos.</td>
</tr>
<tr>
<td>Animations</td>
<td>Its capabilities should be advanced in terms of interactive imitation, media support, animated buttons, elucidation, maps, etc.</td>
</tr>
<tr>
<td>Regularity</td>
<td>It should have regularity i.e. all the letter and image edges should be equal</td>
</tr>
<tr>
<td>Assimilation</td>
<td>It should have capabilities of unification for the softwares that are used at broad range for different jobs.</td>
</tr>
<tr>
<td>Shipment</td>
<td>It should have capability to prosper one piece of content that can be transmitting to unlike media types.</td>
</tr>
<tr>
<td>User companionability</td>
<td>This software should be manufactured such that it affords the effortless and most facile model.</td>
</tr>
</tbody>
</table>

Ethical Requirements for Multimedia Package

The concoction of various divergent technologies is defined to be the multimedia. A few of the ingredients or elements of the multimedia have substantial exploration into the moral consequences and reflections for example, moral concerns relating mass effects (bandura2001, stern 2005, Ziegler 2007), upright portrayal and equitability (babad1999, Dong and Murrillo 2007, maestro and Greenberg 2000, sherman1996) and duplicity (lee 2005) have been inspected with respect to movie and small screen. Principles regarding sound,
picture and computer programs intellectual property right have generated a substantial allot of investigation in the later years.¹⁷

“The Association of Computing Machinery (ACM)¹⁸ furnishes a list of instructions of morality for white collar workers associated in the evolution, growth and expansion of software. They yield the following code of conduct to verify and establish a professional allegiance to the “physical state, protection and prosperity of the communal” appropriate to multimedia fabrication”¹⁹.

**Public**: Software engineers shall act consistently with the public interest in mind.

**Clint and employer**: Software engineers shall act in a manner that is in the best interests of their client and employers consist with public interest.

**Product**: Software engineers shall ensure that their products and modifications meet the highest professional standards possible.

**Judgment**: Software engineers shall maintain integrity and independence their professional judgment.

**Management**: Software engineering managers and leaders shall subscribe to and promote ethical approach to management of software development and maintenance.

**Profession**: Software engineers shall advance the integrity and reputation of the profession consistent with public interest.

**Colleagues**: Software engineers shall be fair and too supportive of their colleagues.

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¹⁷ Greaney, Robin. Ett , May 6,(2007) Ethical Consideration in Multimedia Development p. 3
¹⁸ Copyright(c) 1999 by association of computing machinery, Inc and the institute for the electrical and electronics engineers, Inc.
¹⁹ Ibid p. 4
Self: Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote the ethical approach to the practice of the profession.”

3.4 Basic elements for Multimedia Package

There are various stages involved in the creation of multimedia. Previously referred and described the multimedia is a conglomeration of various media as text, audio, animation and video.

It is expected that the composer and designer of the multimedia should be well equipped and acquainted with the basics of it.

Figure 3.5
Basic Elements for a Multimedia Package

3.4.1 Text

While delivering information, Text is the common elements. It is very important while communicating the interpretations and various ideas. It is present all over, in all the media contents. The significant elements of a text are

Type Face, Font, Animation, Anti aliasing, and Hypertext which embellishes the various text forms and make it more effective and impressive.

It should be very well kept in mind that these texts are not only a means of communication but also they are source of writing and giving information accurately. In every multimedia presentations and online contents Text is always an important part which cannot be ignored in any way. While creating multimedia packages, Text is frequently applied for instance writing headlines, titles and descriptions. So to create an impact on the various contents it is imperative to use the various elements of Text to communicate. Various relevant contents which are used in modifications of a text are given below-:

- Typeface
- Fonts
- Animation
- Kerning
- Anti-aliasing
- Hypertext

**Typeface**

![Image 1 - Serif and Sans Font](image)
Typefaces are of two types given below;

**Serif and Sans serif**

Serif is used to decorate the edges of fonts, whereas Sans serif fonts are without any decoration. Serif is used to present an attractive title and to write contents or descriptions, sans serif is used in order to increase readability.

**Fonts**

![Image 2 - Font style](image)

Different styles of alphabets in particular style is called Font. These styles and sizes of fonts may be change need based. Various styles and pattern are available. Font Colours and textures can be changed according to choice enabling to decorate a particular document and giving it an attractive look. A size of a font is usually measured in points like 10, 12, and 13. One point is equal to 1/72 of an inch. To emphasise a certain text font styles are available as bold, italics, underline and strike through, to easily attract any reader’s attention. Italic style is used to differentiate a person’s name within paragraph. Bold and underline is used to highlight the Titles and headlines. Strike through is used to highlight incorrect words.

**Text Animation**

Text animation is a visual effect. Animations can be used to present any text in a more attractive and interesting manner it defines the way the text
enters or exits in any presentation. Various styles of animations are available for animating the text and it can apply 3d effects in a text. Since animation styles seek immediate attention thus animation effects should be very carefully chosen. It is not recommended to apply various animation effects on a single slide. There are so many softwares available with different choices. There is a wide variety of softwares available which have inbuilt tools for the text animation.

![Text Animations](image3.png)

**Image 3 - Animation of Text**

**Kerning**

Adjustment of the space between two alphabets can be referred as kerning. It is mostly used to make a visually spacious effect. It can be used to adjust the uneven gaps between two character in a very effective and accurate way. It is relevantly used in displaying various icons, such as, logos and brand names.

![Kerning](image4.png)

**Image 4 - Kerning**
Anti-aliasing

Image 5 - Anti aliasing and aliasing of Text

This technique can be used to smoothen the blurry and distorted edges of texts. It is used for the low resolution text material to make it more clearer. The text without aliased affect is often called as ‘gray scale’ text.

Hypertext

Image 6 - Hypertext

Various internet links in a text document is known as hyper text. It is the text which immediately redirects us to the website of any text content. It often appears in blue colour and underlined on the screen. the hypertext are very much useful for creating multimedia presentation, as it reduce the efforts to open links especially by search engines as it redirects to any website by just clicking on a text for more information.
3.4.2 Audio

Audio deals with the various sound effects and sound quality. Sound is a basic requirement, as it enhances the sense to observe and interpret the contents. There are so many features and file formats available to create and modify a sound according to requirement. Various terms regarding audio production are:

- Digital audio
- Sampling Rate
- Sound Bit Depth
- Mono or Stereo
- Digital recording
- Sound Editors
- Sound file formats

Digital audio:

The process of recording a sound on an electronic media such as mobile phones, sound recorder and computers is called digitization. It is a convenient way of preserving voice recordings in various academics and entertainment fields such as lectures, seminars, live performance etc. Digital audios are in great demand today as it can keep preserving the contents which can be used for multiple times at multiple places by generating digital copies and distributing it globally. Recording studios deals with the digital audios. The figure illustrates the recorded audio in digital wave form.
The quality and capacity of sound is measured through sampling rate. It can be measured in hertz (Hz). A common sampling rate which is suitable in any multimedia application must be of 44.1 kilo Hz, 22.05 kilo Hz and 11.026 kilo HZ. The quality of sound depends upon the sampling rate. The Higher the sampling rate, higher will be the quality of sound. If the sound has a low quality the sampling rate will also be low. Higher sampling rate sounds occupies more space in disks. The sampling rate of any sound can be converted easily from higher to lower as per requirement. The following figure 2 illustrates an audio analogue signal which is in green colour and the blue lines presents the digital samples at each amplitude level.

**Image 7 - Waves of Digital Audio**

**Image 8 - Audio Sampling Rate**
Sound Bit Depth

The bit depth means the resolution of the sound. In any graphic image more the no. of pixels, the higher will the resolution. In the same way more the no. of audio samples, the higher will the bit depth of an audio. The bit depth is the no. of bits used to take samples of an audio. Sound bit depth depends on the sampling rate. High quality of sound depends on the high no. of bits in a sample of voice which is generally of 32 bits, and 64 bits.

Mono or Stereo

Transmission of a sound through a no. of channels is called mono and stereo. In Mono one channel for the reproduction of sound whereas in stereo more than one channel is used, it creates a very impressive and natural effect of a sound. Mono sounds are used in mobiles and basic sounds equipments like radio and audio devices. Stereo sounds are used for better effects as in home theatres, movie theatres, auditoriums, and on highly recommended sounds platforms. Stereo sounds are great in demand today, as it gives a real effect to sound from all dimensions. There are different Mono and stereo are available. With the evolution in the technology sound system has also been advanced. For effective sounds there are 5.1 and 16.2 surround sounds systems which make us feel listening as sitting in an actual place. Same are illustrated in following figures:
Digital recording

Recording and of the sounds through various hardware devices such as microphone, synthesizers, data audio tape and keyboard etc is known as digital recording. Digital recording is widely used to enhance the quality of audio recording, we can connect mixtures with the microphones and computer on the consecutive ends as they support for increasing or decreasing the voice gain. They can add reverbs, reduce noise and bypass the sound. Transitions can be applied to fade in and fade out simultaneously while recording an audio. Following figure shows the recording studio room for digital recording.
Sound Editors

Sound editors are used for the Post production of sound after recording and saving it in computer, treating the sound to enhance as well as refine the quality of sound. There are a no. Of softwares developed for editing the sound such as, Sound forge, cool edit, Nuendo, Studio 1, Logic pro for Mac etc. Logic pro has been used as professional level software. A sound editors give a wonderful and magical effects in changing pitch, scale, and the tempo of an audio. Sound editors posses the capability to mix multiple tracks recorded at different time period.
Sound file formats

A file format is a container that stores the sound information in bits. Every operating system supports different file formats. Mac OSX native file format is m4a, Windows native file format is wma. The Universal recommended format is mp3, as it can be played in almost any audio device, whether it is computer, phones, or mp3 players. These various file formats can be used according to the file requirements. The following figure 6 shows various sound file formats:

Image 14 - File formats

3.4.3 Video

Synchronizing video with audio makes the presentation highly interactive as it catches viewer’s interest towards the concepts, presented through visuals. It can be used to communicate the ideas and concepts of real world events through visual effects. Various terms regarding video production are:

- Digital video
- Frame Rating
- Video Formats
- Colour Depth for Digital Video
- Video compression
Video editors

Digital video

Recording video with electronic device camera and transferring it to storage device is called digital video. Digital videos have the capabilities to record the events occurred at different time period and can be combined while when converting into digital videos. We can record various events. Memories can be recorded for preservation for decades. It is a reliable source for archives.

Image 15 - Digital Video

Frame Rating

Video records a multiple frames in motions and the number of frames displayed per second is the frame rate of the video. More the number of frames per second better is the video quality. Less frame rate of a video creates a jerky effect which makes the video slow and disturbed. The standard frame rate in India is 24 (FPS) the quality of any video depends on its frame rate.

Video Formats

The native formats for video are WMV, AVI and for Mac is MOV. In order to support other formats such as mpeg /2, installation of Codecs (coding + decoding) is needed. Video formats can be converted in various softwares such as AVI, AVC. Any video format can be accessible and required to convert video format making it compatible with DVD players.
Various video formats

AVI  MPEG  MPG  MOV  MP4  VFW

The PC requires being adequately equipped with a minimum of 230GB hard disk and a minimum of 2 GB RAM and video graphic cards. A powerful CPU with strong configuration is also required for handling large video data.

Colour Depth for Digital Video

The colour depth is the resolution of the digital video which depends upon the bit, a tiny individual unit or dot used for composing an image. More no of bits in an image create better image quality: see figure no.

![Image 16 - 1 bit, 2 bit, 4 bit, and 8 bit and 24 bit images](image)

Video compression

It is used to reduce the bit size of a video. Video compression is important to make a video convenient in transferring and uploading or downloading The MPEG is basically the highest compression format, to reduce up to half of the size of a video.
Video editors

After recording video, it comes to convert the video into a refined movie; these contain transitions, colour correction and various other effects for giving a professional look. Various software are available to edit video such as Adobe premiere CC, FCP (final cut Pro), and Window movie maker. Video editors contain a project window which can stores all media files, a monitor that display the final edit and the timeline where multiples video clips are combined. Special hardware, Ram and graphics cards are required for large video projects like movies.

3.4.4 Graphics

Graphics are the most commonly used visuals designs created by computer, which represent any information through pictures, diagrams using text. The graphics are designed through various softwares such as Adobe Photoshop, Coral Draw and Adobe Illustrator. In educational multimedia package graphics are highly recommended as they convey the information of the concepts clearly. The richness of multimedia and the effective communication depend upon graphic presentation. The attributes of colour, texture, pattern and animation enrich a multimedia presentation. There are two types of Graphics:

- Raster Graphics- The real world images are called raster graphics, which are based on pixels and depended on resolution. The pixels an image will be distorted if resize to large scales. Figure is showing the each pixels of the flower when it is scaled and zoomed.
Vector Graphics- The abstract designs are vector graphics which are made of shapes, lines, drawings and diagrams. Vector graphics are resolution independent. They can be scaled to any size, without any distortions and the image will clear and perfect. The figure shows that on scaling the vector image it is not disturbed and the quality is as original.

![Vector Image](image18.png)

**Image 18 - Vector image**

**Graphic formats:**

A file format is a container that stores the graphics information in bits. Every operating system supports different file formats. Most common standard and universally adapted Format is JPEG. Various other formats are GIF, PNG.

**Scanning**

Converting and real image into a digital form is called scanning. Resolution of a scanned image is generally between 50 to 1200 dots per inch (DPI). No. of pixels in per square image is called as resolution of an image which is generally called dot per inch.

![Scanner](image19.png)

**Image 19 - Scanner**
3.4.5 Animation

Animation is a process of moving vector graphics which are computer generated (CG) images. In any multimedia package it is the chief element. Animations are designed through giving motion effects to various diagram, sketches, paintings, line and scales. It is a form visual illustration. Computer generated softwares are very necessary to build animations. Animation has a wider scope as it is very much popular in commercial fields such as entertainment, business, and educational fields.

**Key Frames** Recording the different frames of an animation sequentially and consecutively. Key frames are the major part of animation, which able to shows the different single timing of a moving object.

![Image 20 - key frames of a moving object.](image)

**Software tools**

The computer animation production is determined by a no. of softwares to increase the qualities of an animation. Popular animation software packages for windows are 2D Flash, after effects, Studio Max, Adobe Premiere, etc. These softwares require a proper training and skill to operate.
3.5 Role of Multimedia in Music Education

Diversity and transformation is the law of nature. There has been a tremendous development in society from ages to ages. Situations are not always stable. Each condition in our society, such as social, cultural and political environment is regenerating from time to time. In the age of science and technology, the quality of knowledge is rapidly expanding. Till date the secondary and senior secondary students in India are taught in a traditional format, where much of learning comes from reading the textbooks, attending instructor-led classes. There is a need of innovation in our traditional system of instruction to meet the challenges of Present day society. Students need unique experiences in the learning of the contents.

Learning becomes effective when teacher uses several resources in classroom. Student understands of facts, concepts and principles become effective when they are taught through innovative tools of modern technology. Computers are being proved to be the best assistance of teachers who aspires to teach effectively. It becomes easier for teachers to teach in classrooms the understandings of concepts by the students is much more effective with the help of audio visual effects of computers as compared to conventional methods.
of teaching with chalkboards. Thus transfer of knowledge becomes an easy and effective job.

Today’s Indian music which is in existence was not suddenly created by anyone's intellectual efforts. Its fundamental changes and continuous growth have given it the current form. Education is proliferating further and along with itself it is taking a very developed and persuasive tradition of India. New technology has played a significant role in the development of music education. There has been a tremendous development in institutional music education that are using the modern technology. There has been a very significant achievement of teaching and learning method during pre independence era, still continuing in the Post-Independence period.

This tremendous technology advancement all around us has greatly influenced the process of teaching and learning of Music Education. A large number of teaching aids have been adopted in educational institutions. However, in the field of music, one notices that hardly any such aid is used. “We live in a world of media. Our nation’s young people are called the “Television Generation” because most of them spend more hours in front of the TV than they do in school. We are a visual culture, living in an environment impacted by media messages of every kind.”

In Indian classical music teaching through modern educational system is just as necessary as in any other subject. With the help of various ancillary materials and teaching methods, the teaching not only becomes easier, simultaneously the contents of the study also become interesting, students in spite of taking their studies as burden, start to learn the contents as a playing method.

Music education has two parts, theory and practical. Though music is predominantly a practical subject, still the theory aspect cannot be underestimated in schools and colleges. Theory is usually taught by lecture

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21 Pandey, V.C. Educational Technology, p-76
method, which is not a very interesting and effective method of theory teaching. Without the knowledge of grammar one cannot gain knowledge of language and literature. Similarly, without the knowledge of theory one cannot gain knowledge of practical music,

Theoretical aspects of music are very important for complete knowledge of the subject. Standardised rules and regulations in theory helps the students to know the appropriate methods for practise of music. Thus it helps to remove false practices of classical music from the society and it maintain the sanctity of classical music. So, from the very beginning, every student should gather at least a little knowledge of theory.

Fortunately, due to the advances in information technology, more effective techniques of teaching various subjects and contents are available to the teachers. Techniques like programmed learning, Team Teaching and Multimedia Packages are available which are very effective and potent in delivering the goods.

There are many advantages of multimedia technology apart from being a strong way of giving presentations. In music theory, the contents are related to science, history, math and psychology, which are very much difficult to understand only by reading the material from text books and attending lectures. Students find it difficult to grasp the concepts. By various media forms, students can acquaintance themselves better with their subjects. The concepts like sound, pitch, Timber, intensity are very scientific topics, which are difficult to understand only through books. So, these should be taught by using multimedia packages.

**Uses of Multimedia Aids in Music Education**

- It helps in understanding the concepts related to science in music quickly.
- Essential for the development of knowledge.
• With them, students seem too interested in studying and not get tired easily.
• It is helpful in generating the curiosity to learn.
• It develops the eagerness to boosting creativity.
• It promotes the development of newer ideas.
• The knowledge becomes long lasting.
• Helpful in learning through Distance education.
• Students can attend and enjoy the music conference held in India and abroad by seated at their place and institutions.
• With the help of these teaching equipments teachers can make the studying contents more ,sustainable ,understandable, interesting, affecting, inspiring , captivating , and impressing
• It builds a unique imprint of knowledge on student’s brain.

Modern equipments are already being used in music education like various electronic instruments such as Electronic Tanpura, Electronic Swarpeti, and Electronic Tabla, microphones, sound system, to enhance the practical aspects of Music Education. But to teach theoretical contents no such equipments are being used in teaching and learning.

Multimedia technology is very popular in our society as we can see that in each home today, there are video games with animated graphics for children to play. Children love these electronic gadgets. They learn through these techniques very easily because it combines text, audio, video and, graphics, to give a dynamic and capturing effects. So this technology is a must to utilize for teaching purposes in music education also.

“During the past ten years, teachers have significantly increased their use of multimedia technology to enrich the learning environment in secondary schools. As a result of dramatic advances in available softwares, teachers now have the ability to incorporate several strategies into each lesson.”

22 Fenton, Kevin. Using Multimedia to Develop Musicianship. p. 27
In a country like India, where Adequate funds are not always available for proper functioning of an institution, this multimedia technology can give optimum learning experience at a very low cost. It is a long lasting and cheaper method of delivering education which can be availed easily by the common people.

The use of technology depends upon the requirements of students. There are many Advantages of using this Technology. Learning becomes more interesting, more fun and friendly, more participatory, oriented for specific goals. It increases the relation between the students and the teachers. It is not affected by distance; anybody can tailor it to its own individual study method. There is no fear of any failure.

In the light of above said, it is observed that the Multimedia Technology has a significant role in Education scenario. Role of multimedia packages have imparted a greater effect in Music Educations and it can be proved as a better technique to promote Music Education and also in Teaching Music to the students.

**Conclusion**

Due to the advances in science and development of new teaching methods, a new teaching technique has entered the world of education which is now a day’s commonly known as multimedia technique. This is becoming very popular and is highly effective as a teaching tool. Multimedia technology is in leading edge today and getting popular in education system. Multimedia Packages have been developed in many contents areas and have been found to be very effective in helping the students learn the content at their own pace. Such packages are badly needed in teaching of Music so that on the one hand, the pressure on the music teachers is reduced and on the other, the students of Music are able to learn various concepts of theory of music at their own pace.