COURSE GUIDE

FMC 215

PRINCIPLES OF SOUND RECORDING AND EDITING IN FILMS

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INTRODUCTION

Welcome to FMC 215 -Principles of Sound Recording and Editing in Films. This course FMC 215 Principles of Sound Recording and Editing in Films is a two-credit unit course. The course will examine the techniques of motion picture production for studio and location, using various equipment and accessories. It will also introduce you to the theories and practices of sound productions for film and television. In so doing, you will be exposed to the components of sound, their recordings, challenges and applications. The course also introduces you to different editing applications, principles and practices of editing using these applications.

This course guide provides you with information on the course contents. It also provides you with a list of relevant materials you will need to obtain an in-depth understanding of the subject matter. The course design is structured in a way that would enable you gain insight into the course. It will engage you in productive thinking through the various issues you will study.

COURSE OBJECTIVES

The objectives of each unit are clearly stated at the beginning of the unit. This will equip you with an expectation as you begin to study. Go through the objectives of every unit and ensure you achieve them at the end of your study period.

WORKING THROUGH THE COURSE

To complete the course, you are required to read the study units and other related materials. You will also need to undertake practical exercises for which you need a pen, a note-book, and other materials that will be listed in this guide. The exercises are to aid you in understanding the concepts being presented. At the end of each unit, you will be required to submit written assignment for assessment purposes.

At the end of the course, you will be expected to write a final examination.

STUDY UNITS

FMC 215 is packaged in five modules of varying units and lengths. The modules and the corresponding units are outlined as follows.

MODULE 1

Unit 1 Motion Picture Production Equipment and Production Techniques for Studio and Location Operations

Unit 2 Different Camera Gauges, Lenses and Accessories and Camera Formats and Lighting for Various Situations

Unit 3 Theories and Practice of Sound Production

MODULE 2

Unit 1 Components of Sound and Sound Recording Equipment

Unit 2 Applications and Challenges in Sound Recording

Unit 3 Understanding the TV Screen Space

Unit 4 Media Acquisition, Management and Organisation

Unit 5 Fundamental Principles in Editing

MODULE 3

Unit 1 Introduction to Cinematography

Unit 2 Camera Types, Parts, Accessories and Camera Image Formation Process and Capabilities

Unit 3 Techniques of Cinematography

MODULE 4

Unit 1 Introduction to Principles and Practice of Sound Design.

Unit 2 Microphones and Their Pick-Up Patterns

Unit 3 Sound Mixers, Consoles and Sound Recording Devices

MODULE 5

Unit 1 Introduction to Film & Video Editing

Unit 2 Film & Video Editing Systems and Technology

Unit 3 Editing Applications

ASSESSMENT

There are two aspects of the assessment of this course, which are the tutor- marked assignment and the written examination. You will be expected to carry out three tutor-marked assignments at scheduled intervals. Each assignment carries ten marks. The three assignments will account for 30% of the final assessment. At the end of the semester, you will be required to write an examination which will account for 70% of the assessment.

REFERENCES/FURTHER READING

Please consult the following materials in addition to other relevant ones to enhance your knowledge and skill.

Sharps, Wallace. (1959). *Dictionary of Cinematography and Sound Recording*. London: Fountain Press.

Clarke, G. Charles & Strenge, Walter. (1973.). *American Cinematographer Manual*.Hollywood: American Society of Cinematographers Hollywood.

Zettl, Herbert, (2000). *Television Production Handbook.* (7th ed.). San Francisco State University.Wadsworth Thompson Learning.

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Hacker, P.M.S. (1987).*Appearance and Reality*. Oxford: Basil Blackwell.

Heymans, G. (1905, 1911). Einführung in dieMetaphysik auf Grundlage der Erfahrung, Leipzig: Barth.

Hobbes, T. (1651, 1966). Leviathan, in The English Works, Aalen: ScientiaVerlag.
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Descartes, R. (1649). The Passions of the Soul, Indianapolis: Hackett Publishing Company, 1989.

Dretske, F. (1967). 'Can Events Move?', Mind, 76, 479–92; reprinted in R. Casati and A. Varzi (eds.). 1996, pp. 415–428.

Ducasse, C. J. (1926). 'On the Nature and the Observability of the Causal Relation', Journal of Philosophy, 23: 57–68.

Evans, G. (1980, 1986) ."Things Without the Mind", in G. Evans, Collected Papers, A. Phillips (ed.), Oxford: Oxford University Press, 1986, pp. 248–90. Originally published in Z. van Straaten, Philosophical Subjects: Essays Presented to P.F. Strawson, Oxford: Clarendon Press.

TUTOR-MARKED ASSIGNMENT

At the end of each unit, you will find tutor-marked assignments. In handling these assignments, you are expected to apply the information, knowledge and experience acquired during the course. The tutor-marked assignments are now being done online. Ensure that you register all your courses so that you can have easy access to the online assignments.There is an average of two tutor-marked assignments per unit. This will allow you to engage the course as robustly as possible. You need to submit at least four assignments of which the three with the highest marks will be recorded as part of your total course grade. This will account for 10 percent each, making a total of 30 percent. When you complete your assignments, send them including your form to your tutor for formal assessment on or before the deadline.

Self-assessment exercises are also provided in each unit. The exercises should help you to evaluate your understanding of the material so far. These are not to be submitted. You will find all answers to these within the units they are intended for.

FINAL EXAMINATION AND GRADING

There will be a final examination at the end of the course. The examination carries a total of 70 percent of the total course grade. The examination will reflect the contents of what you have learnt and the self-assessments and tutor-marked assignments. You therefore need to revise your course materials beforehand.

COURSE MARKING SCHEME

The following table sets out how the actual course marking is broken down.

ASSESSMENT	MARKS
Four assignments (the best four of all the assignments submitted for marking)	Four assignments, each marked out of 10%, but highest scoring three selected, thus totalling 30%
Final Examination	70% of overall course score
Total	**100% of course score**

FACILITATORS/TUTORS AND TUTORIALS

Information relating to the tutorials will be provided at the appropriate time. You are advised to attend tutorials and participate in all learning activities.

HOW TO GET THE MOST FROM THIS COURSE

1. There are 17 units in this course. You are to spend one week in each unit. In distance learning, the study units replace the university lecture. This is one of the great advantages of distance learning; you can read and work through specially designed study materials at your own pace, and at a time and place that suites you best. Think of it as reading the lecture instead of listening to the lecturer. In the same way a lecturer might give you some reading to do. The study units tell you when to read and which are your text materials or recommended books. You are provided exercises to do at appropriate points, just as a lecturer might give you in a class exercise.

2. Each of the study units follows a common format. The first item is an introduction to the subject matter of the unit, and how a particular unit is integrated with other units and the course as a whole. Next to this is a set of learning objectives. These objectives let you know what you should be able to do, by the time you have completed the unit. These learning objectives are meant to guide your study. The moment a unit is finished, you must go back and check whether you have achieved the objectives. If this is made a habit, then you will significantly improve your chance of passing the course.

3. The main body of the unit guides you through the required reading from other sources. This will usually be either from your reference or from a reading section.

4. The following is a practical strategy for working through the course. If you run into any trouble, telephone your tutor or visit the study centre nearest to you.

Remember that your tutor's job is to help you. When you need assistance, do not hesitate to call and ask your tutor to provide it.

5. Read this course guide thoroughly. It is your first assignment.

6. Organise a study schedule- 'Course Overview' to guide you through the course. Note the time you are expected to spend on each unit and how the assignments relate to the units.
7. Important information; e.g. details of your tutorials and the date of the first day of the semester is available at the study centre.
8. You need to gather all the information into one place, such as your diary or a wall calendar. Whatever method you choose to use, you should decide on and write in your own dates and schedule of work for each unit.

9. Once you have created your own study schedule, do everything to stay faithful to it.

10. The major reason that students fail is that they get behind in their coursework. If you get into difficulties with your schedule, please let your tutor or course coordinator know before it is too late for help.

11. Turn to Unit 1, and read the introduction and the objectives for the unit.

12. Assemble the study materials. You will need your references for the unit you are studying at any point in time.

13. As you work through the unit, you will know what sources to consult for further information.

14. Visit your study centre whenever you need up-to-date information.

15. Well before the relevant online TMA due dates, visit your study centre for relevant information and updates. Keep in mind that you will learn a lot by doing the assignment carefully. They have been designed to help you meet the objectives of the course and, therefore, will help you pass the examination.

16. Review the objectives for each study unit to confirm that you have achieved them. If you feel unsure about any of the objectives, review the study materials or consult your tutor. When you are confident that you have achieved a unit's objectives, you can start on the next unit. Proceed unit by unit through the course and try to space your study so that you can keep yourself on schedule.

17. After completing the last unit, review the course and prepare yourself for the final examination. Check that you have achieved the unit objectives (listed at the beginning of each unit) and the course objectives (listed in the course guide).

SUMMARY

This is a very interesting course, you will get the best out of it if you cultivate the habit of relating it to real life happenings.

Best wishes from us!

Thank you.

MODULE 1

Unit 1 Motion Picture Production Equipment and Production Techniques for Studio and Location Operations

Unit 2 Different Camera Gauges, Lenses and Accessories and Camera Formats and Lighting for Various Situations

Unit 3 Theories and Practice of Sound Production

UNIT 1 MOTION PICTURE PRODUCTION EQUIPMENT AND PRODUCTION TECHNIQUES FOR STUDIO AND LOCATION OPERATIONS

CONTENTS

1.0 INTRODUCTION

This unit of study will explore the various equipment and accessories used in studio and location productions. You will learn how to identify studio and location equipment and the challenges associated with both studio and location shooting.

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- identify and explain different types of cameras such as HDTV, analog and digital cameras, ENG/EFP cameras and camcorders
- describe power supply, camera cable, connectors, filter wheel, view finder, tally light, intercom and ENG/EFP elements.

3.0 MAIN CONTENT

3.1 Motion Picture Production Equipment

There are different types of motion pictures cameras and they can be differentiated on the basis of sound recording capabilities. There are two basic systems by which electronic film cameras can record synchronous sounds:

a) Single system or Sound-on-Film (SOF) this is the recording of synchronous sounds on the edge of the film as it runs through the camera. The camera records the images and the sounds at the same time on the film strip.

b) Double system Recording. This is where a separate high quality audio recorder records sounds which can be played back in perfect synchronisation with the recorded film images

Location Based Cameras

Cameras are generally classified by their electronic make-up and by how they are used. These cameras can be further classified into three groups:

- Studio camera,
- ENG/EFP cameras and camcorders and
- Consumer Camcorders.

The studio camera usually mounted on a pedestal is a high quality camera including high-definition television (HDTV) cameras.

The (ENG)- electronic news gathering and EFP- electronic news production are portable, self-contained cameras designed to produce high quality pictures. The ENG/EFP cameras can be mounted on an ordinary tripod.

Studio Operational Characteristics/Operational Items

a. Studio camera controlled remotely by its control unit
b. Most operational controls are on the CCU
c. Power supply
d. Camera cable
e. Connectors
f. Filter wheel
g. View finder
h. Tally light
i. Intercom

ENG/EFP Operational Items – Cameras/Camcorders

a. Power supply
b. Camera cable
c. Connectors
d. Exchangeable lenses
e. Filter wheel
f. View finder
g. Tally light
h. VTR Record
i. End of tape warning
j. White Balance, gain control, play back and optical filter positions.

3.2 The Studio-Layout and Operation

The studio provides for all the proper environment and coordination of all major production elements such as cameras, lighting, sound, scenery and the action of performers. The physical layout of the studio should take care of the floor space i.e. size, floor, ceiling height, Accoustic treatment, Air-conditioning Doors. Major installations to include; intercommunication systems, studio monitors, programme speakers, lighting dimmer and patch board. The studio has three major production centres:

- **The studio: -** This is a designated area where production takes place.
- **The studio control room: -** This is the area where all production activities are coordinated. The Director, Associate Director, (AD) Technical Director (TD) producers and production assistants make decisions here concerning the programme being recorded – switching, audio control and video control takes place here.
- **The Master Control:** – This is the technical nerve Center of the studio with tape based or tapeless programme input, programme storage and programme retrieval.
- **Studio support areas:** – Areas for scene and property storage and for make - up of artistes and dressing rooms.

The control monitors display a specific video image supplied by video sources such as studio cameras, VCRs, titles, special effects or remote satellite feeds. The line monitor shows what the director has selected to go on air (and/or to be recorded on video tape).

The Audio Control has VU meter with volume indicators, sound quality controls and volume controls.

Studio Cameras

Studio cameras are mounted on studio pedestals which permit smooth dollies and tracks and have a telescoping center column that pedestals the camera from a low of 2 feet to a maximum height of about six feet from the studio floor.

VTR The video tape recorder is an electronic recording device used in the studio to record video and audio signals on video tape for later playback or post production editing. The VTRS are located in master control room.

3.3 The Role of the Director in Studio Operation

It is the programmes director that calls for the shots. He uses the intercommunication to talk with the camera operators telling them what kind of shot to frame. Each camera displays images on a monitor as called by the director for an effective switch or cut from one shot to the other. The cameras give different shots – from Long shot to

close-up as the director desires. Cameras are positioned at different angles to give various viewpoints and movements- dolly, zoom, tilt etc.

Single Camera – ENG Operation

The single camera production technique is associated with the birth of the cinema. It is the standard mode of production for making movies up to this day. It is used on locations in productions such as drama, documentaries, comedies, news etc. Unlike the television studio based productions where more than one camera is used to give different types of shots from various angles, the single camera technique uses the same camera to achieve various perspectives in shooting. The camera used could be a camcorder with a built in microphone or an input where an external microphone could be plugged in. The camcorder includes all video and audio recording facilities.

Both the studio and location productions share common approach to production however the limited space in the studio does not allow for Extreme Long Shots as obtained in an exterior setting depicting a vast landscape when shooting on location.

4.0 CONCLUSION

This unit of has explored the various equipment and accessories used in studio and location productions. You must have learned how to identify studio and location equipment; you should also be aware of the challenges associated with both studio and location shooting.

5.0 SUMMARY

Recall that there are different types of motion pictures cameras; there are two basic systems by which electronic film cameras can record synchronous sounds.There are several studio operational characteristics and operational items. The studio provides for all the proper environment and coordination of all major production elements. It is the programmes director who is in charge of affairs.

6.0 TUTOR-MARKED ASSIGNMENT

1. Place the Camcorder camera beside the HDTV studio camera, examine and discuss your findings.
2. What camera moves can you perform using the studio pedestal and the camera tripod?
3. Whereas the studio employs multiple cameras to shoot a scene, how does a single camera shoot a similar scene?
4. How and where is the video/audio recorded during a studio based operation?
5. Identify the different parts of the HDTV studio camera and the ENG/EFP Camera and explain what they are used for.
6. Why are some cameras most suitable for use only in a studio and not for location/field work?

7.0 REFERENCES/FURTHER READING

Clarke, G. Charles & Strenge, Walter. (1973). *American Cinematographer Manual*. Hollywood: American Society of Cinematographers Hollywood.

Kindem, Gorham & Musburger, B. Rober. (2005). *Introduction to Media Production, The Path to Digital Media Production*. London: Focal Press.

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UNIT 2 DIFFERENT CAMERA GAUGES, LENSES AND ACCESSORIES AND CAMERA FORMATS AND LIGHTING FOR VARIOUS SITUATIONS

CONTENTS

1.0 INTRODUCTION

In this unit , we shall examine cinema gauges, camera lenses and their accessories. We will also explore as we examine critically how these affect image formations. This unit will also explore various types of lighting and how to achieve them in a production.

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- explain the different cinema gauges
- describe the function of lenses and their various types
- discuss why lenses are very vital in photography
- explain the different types of lighting and how to achieve them.

3.0 MAIN CONTENT

3.1 Cinema and Film Gauges

Technological developments over the years have introduced several film gauges throughout the development of cinema. The most common gauge today is 35mm though 16mm, 9.5mm, 8mm, super 8mm and 70mm have been the traditional film gauges. Film gauge is described as a physical property of photographic or motion picture film stock. The narrow gauge film dimensions are:

- 16mm sound film single perforation
- 16mm silent film with perforations on the two sides of the film strip
- 9.5mm silent film with single perforation in the middle of the film strip and
- 8mm film with single perforations on one side of the film strip.

Cine film is designated according to its width, 35mm being said to be of "standard gauge". In addition to special gauges made for wide screen processes, the only other professional size of film, other than for magnetic recording, is 16mm wide and this is termed "substandard", or "Narrow gauge". Smaller gauge films for purely amateur use such as 9.5mm and 8mm are named by their sizes.

Lenses: - The Camera Eye

The lens is a transparent medium, usually glass, bounded by two surfaces, generally curved. It is a glass or plastic designed to focus and concentrate light on the surface to form an image. This broad definition covers all lenses used for the collection, transmission and focusing of light rays. These range from those in giant telescopes to humble projector condensers; and include our especial interest, the camera lens. However, there are certain factors common to all lenses and in particular, they can be described by the two variables of focal length and maximum aperture.

Focal Length

The distance from the optical centre of the lens to the point where it brings to a sharp focus an image placed at an infinite distance. The focal length is stated in inches or centimeters and is usually engraved on the lens mount with the prefix "F". Depending on the size of the lens, the F/number may range as follows" F1.8, F2, F2.8 F4, F5.6, F8 F11, F16, F22 etc.

Aperture of the Lens

This is an opening or gap. It is the Iris opening of the lens, usually measured in F-stops.

3.2 Types of Camera Lenses

- **Standard lens:** A lens with a mid-range focal length, typically around 50mm. This lens sees in a similar proportion to the human eye.
- **Wide angle:** Wide-angle lenses have three classes: Wide, Ultra wide and Fish eye.
- **Macro lens:** A lens designed especially for close-up photography of very small/tiny objects.
- **Telephoto lens:** This has a long focal length and provides a high level of magnification allowing you to photograph objects at a moderate to far distance.
- **Zoom lens:** A zoom lens enables a zoom effect to be achieved in one continuous smooth movement through a rapid increase in focal length over a set range. This is accomplished without the subject becoming out-of-focus or the lens focus controls being adjusted during the zoom movement. Zoom is the technique whereby, the subject is brought rapidly into a close-up from a long shot in one continuous movement.

3.3 Lens Accessories

- **Lens shade:** Protects the lens elements from picking up light distortions from the sun or bright light.
- **Lens filter wheel:** A number of filters that can be used to correct the colour in day/light, tungsten and fluorescent lighting conditions.
- **Lens cap:** Protect lens from dust, scratches etc.

Other accessories include: Lens mount adopters, Lens and optics cleaning, tele-converters, Drop in rear filters and holders.

Lens filters

Lens filters are transparent or translucent or gelatin elements that attach to the front of a lens. They protect the camera lens, alter characteristics of light, add special effects and colours to the image.

Gels

Gels are flexible sheets of transparent coloured plastic that can act as colour filters when they are placed in front of light sources, such as windows or lamps. A gel can be used to convert 5400-degree K light coming through a window to 3200-degree K light temperature of interior room lighting.

3.4 Lighting

Lighting is one of the most creative and visually exciting tasks in video and film production. Visual artists refer to lighting as painting with light. There are basically two sources of light: Day Light which is 5400 degrees' K and Artificial light 3200 degrees K. Lighting instruments came in different sizes and shapes with various accessories. These are:

a. Sport lights
b. Flood lights
c. Broad or pan lights
d. Reflector spots
e. Fresnel
f. Incandescent
g. Quartz or Tungsten Halogen
h. HMI
i. Fluorescent

Lighting accessories

These include; C-clamps, Barn doors, carrying case, Gels, Scrims, Umbrellas, Stands reflectors and diffusers etc.

Styles of Lighting

Basic lighting to create modeling of an image to attain a three dimensional effect you need the following:

- **Key light:** - The dominant light used for illuminating a scene and deciding the key or mood of the lighting.

- **Fill light:** Secondary lighting used to illuminate the areas cast in shadow by the key light
- **Back light:** The lighting of any subject from behind, when viewed from the camera position so as to separate the subject from the background.

Lighting styles: -

- **Three-point lighting: -** Key, fill and back light. A basic lighting technique that helps create an illusion of three-dimensionality by separating the subject from the background.
- **Silhouette lighting:** A Silhouette effect is created when a light source is placed behind a subject with little or no light in front of the subject.
- **Chiaroscuro Technique:** The use of strong contrasts between light and dark, usually bold contrasts affecting a whole composition.
- **Cameo lighting:** Using a spot light that accentuates a single person standing out of a dark background. It creates an angelic feeling.

4.0 CONCLUSSION

In this unit, we have examined cinema gauges, camera lenses and their accessories. We have also explored how these affect image formations. Again, we have explored various types of lighting and how to achieve them in a production.

5.0 SUMMARY

There are different cinema gauges. There are various types of lenses, each with its own functions. Lenses, for various reasons, are vital in photography. Lighting being very important, can be achieved in various ways.

6.0 TUTOR-MARKED ASSIGNMENT

1. What do you understand by the term cinema gauge?
2. What is the function of a camera lens? List and describe the different types of lenses and the accessories that come with the lens
3. What is a silhouette and how is it obtained?

4. Take a shot of someone at sunset, sunrise and at night – as you position your subject directly backing the light source. What do you notice from the three shots?
5. What do you understand by the term three-point-lighting? How is this achieved and to what effect.

7.0 REFERENCES/FUTHER READING

Clarke, G. Charles & Strenge, Walter. (1973). *American Cinematographer Manual*. Hollywood: American Society of Cinematographers Hollywood.

Kindem, Gorham & Musburger, B. Rober. (2005). *Introduction to Media Production, The Path to Digital Media Production*. London: Focal Press.

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UNIT 3 THEORIES AND PRACTICE OF SOUND PRODUCTION

CONTENTS

1.0 INTRODUCTION

In this unit, you will be exposed to the theories and practices of sound production for film and television. There are several theories formulated by scholars in order to understand what sound is and how it is produced. The knowledge of the theories of sound and how sound is produced for film will give you leverage in sound recording. You will compare both processes to discover areas of differences.

2.0 OBJECTIVES

By the end of this unit , you will be able to:

- identify the various theories of sound used in the production of sound for both television and film
- analyse the practice of sound production for both television and film
- examine the differences between recording sound for film and for television.

3.0 MAIN CONTENT

3.1 Theories of Sound

There are many theories of sound relevant to film and television sound production. The main issues which have necessitated the formulation of theories of sound concern the nature of sounds. Sounds enter the content of auditory perception. But what are they? Are sounds individuals? Are they events? Are they properties of sounding objects? If they are events, what type of event are they? What is the relation between sounds and sounding objects? Temporal and causal features of sounds will be important in deciding these and related questions. However, it turns out that a fruitful way to organise these issues deals with the spatial properties of sounds.

Indeed, the various philosophical pronouncements about the nature of sounds can be rather neatly classified according to the spatial status each of them assigns to sounds. Where are sounds? Are they anywhere? These questions have led philosophers to formulate theories to provide ansers to them. These include:

- **Proximal -**Proximal theories would claim that sounds are where the hearer is.
- **Medial**- Medial theories – exemplified by mainstream acoustics – locate sounds in the medium between the resonating object and the hearer.
- **Distal**- Distal theories consider sounds to be located at the resonating object. Finally,
- **Aspatial**- Aspatial theories deny spatial relevance to sounds. There are significant variants of each of these

Sound theories can also be classified according to other dimensions, such as the metaphysical status they accord to sounds (for instance, as occurring events as opposed to properties or dispositions). We shall see some of the interactions between these different accounts.

1. Proximal Theories of Sounds

Proximal theories of sounds construe sounds as located at or beneath the bodily surface of the hearer. We distinguish two main strands:

- **Sounds as Sensations** - The sound-as-sensations theory is justified by some facts about auditory experience. People report hearing voices and bells even when no one is speaking and no bell is ringing. Various examples of subjective sounds are documented under the label of tinnitus. In an an echoing chamber, most subjects experience subjective buzzing and whistlings. Some subjects undergo pathologic tinnitus when they hear sounds that disrupt their normal auditory capabilities. If sounds are simply defined as the objects of audition, then they are easily identified with the qualitative aspects of auditory perception. Various strands of indirect realism in perception would make this view mandatory. According to them, it is by hearing the immediate, proximal items that we hear some distal events or objects. In such a case sounds would be defined as the immediate objects of auditory perception.
- **Sounds as Proximal Stimuli** - while the sound originates at a distance and we can hear that it is coming from a direction and even place, and while there is no auditory experience of hearing that the sound is where we are, the sound that we hear is nonetheless where we are. This leaves open the possibility that an unheard sound be located away from the hearer. Support for this position comes from the following example. If I hear the noise of a motorcycle far away, the physical event at my ear is qualitatively different from the physical event that is produced at the motorcycle's place. If I was close to the motorcycle, the physical event at my ear would be completely different from, and would not correspond to that of a motorcycle driving far away.

2. **Medial Theories of Sounds**

Medial theories construe sounds as features of the medium in which a sounding object and a hearer are immersed. The identification of sounds with sound waves is the major example of medial theories.

- **Sounds as Events or Properties of the Medium** - In his treatise *On the Soul,* Aristotle wrote that “sound is a particular movement of air”. The natural scientists of the 17th Century refined this intuition into the wave theory of sounds, which appeared to be an obvious competitor for the quality or

sensation (proximal) view. Indeed, around 1636, Mersenne measured the speed of propagation of sound waves. Both Galileo and Descartes were aware that the medial account was revisionary relative to a common sense view of sounds, or at least as revisionary as is the sensation view. Sounds for the wave view or the sensation view are not what we unreflectively take them to be on the basis of the content of auditory perception. (Indeed, Galileo himself endorsed both a proximal theory—sounds as sensations – and a medial theory, thereby possibly originating a dualist account.) At the same time Galileo and Descartes, as well as other modern philosophers, were not particularly keen in detailing the phenomenological content of auditory perception.

- **Sounds as Waves** - The wave account is, of course, endorsed by modern acoustics. Sounds are construed as mechanical vibrations transmitted by an elastic medium. They are thus described as longitudinal waves, defined by their frequency and amplitude. A vibrating object (the sound source, such as a moving vocal chord or a vibrating tuning fork) creates a disturbance in the surrounding medium (say, air, or water). Each particle of the medium is set in back-and-forth motion at a given frequency and with a given amplitude, and the motion propagates to neighboring particles at the same frequency, undergoing an energy loss that entails a decrease in amplitude. Seen macroscopically, the propagation of sound is the propagation of a compression in the medium followed by a depression, that is, the propagation of a wave. The behavior of each particle is described by a sinusoid that maps the cyclical pattern of compressions and depressions against time. A cycle is the complete path of the sinusoid from crease to crease, at the end of which the particle is back to its starting position. Amplitude is the distance between creases and valleys in the sinusoid, period is the distance between a crease and its successor, and frequency is the number of cycles per time unit.

Contemporary philosophers of perception of the physicalist strand tend to align themselves on the wave theory and agreed that, "…the sound we hear is identical with the train of airwaves that stretches from the distant sounding object to our ear." And indeed, the physicalist's account of sounds seems to make a good claim to successful

reduction of key auditory phenomena based on the identification of sounds with sound waves in a medium in which a sounding object (and possibly a hearer) is present.

3. Distal Theories of Sounds

After proximal and medial theories, one should consider another candidate for the physical identification of sounds, namely distal properties, processes or events in the medium inside (or at the surface of) sounding objects, or in the stuff of the sounding object. Distal views claim their superiority to non-distal competitors in virtue of their adherence to the spatial structure of auditory content. As we have seen, we do hear sounds both as externalised (hence auditory content is at odds with proximal views) and as distally located (hence auditory content is at odds with medial views). There exist at least four varieties of the distal account of sounds: The Property Theory, the Located Event Theory, the Relational Event Theory, and the Dispositional Theory. These account all subscribe to the idea that sounds are distally located, but they differ in ascribing to sounds different ontological status. Let us take them in turn.

4. Aspatial Theories of Sound

Aspatial theories deny either (i) that sounds are intrinsically spatial, or (ii) that auditory perception is intrinsically spatial. Arguably, claim (i) implies claim (ii), but the converse is not true, which leaves room for an interesting aspatial theory of auditory perception which nevertheless acknowledges that sounds have some spatial locations.

- Aspatial Sounds - We have seen the use of phenomenological arguments against both medial and proximal theories of sound. To sum them up, one may claim that, first, auditory experience has a spatial content whereby sounds seem to be located in egocentric space (to the left, above, in front of us, etc.). Second, unless one subscribes to an error theory of auditory experience, sounds are where they are (normally) heard to be, namely at their sources. Auditory concept of space… is an impossibility. The fact that, with the variegated types of sense-experience which we in fact have, we can, as we say, ‘on the strength of hearing alone’ assign directions and distances to sounds, and things that emit

or cause them, counts against this not at all. For this fact is sufficiently explained by the existence of correlations between the variations of which sound is intrinsically capable and other non-auditory features of sense-experience."

- **Aspatial Auditory Perception -** It is possible to argue that auditory perception is not intrinsically spatial independently of a commitment to the claim that sounds do not have spatial locations. This is O'Shaughnessy's view, who writes that "while we have the auditory experience of hearing that a sound comes from p, we do not have any experience that it is here where it now sounds… And this is so for a very interesting reason: namely, that we absolutely never immediately perceive sounds to be at any place" (2000: 446). However, O'Shaughnessy does not draw the conclusion that sounds have no spatial locations. On the contrary, as we have seen, he defends a proximal account of the location of sounds, according to which sounds are where hearers, rather than sources, are.

3.2 Practices of Sound Production

The process of sound production for film or television purposes usually consists of the four phases: recording, - mixing - synchronisation, and - editing. All these phases are very complex and deal with huge range of problems. That's why a whole team of sound professionals should be involved in sound design and production.

- **Recording**. The general aim of the recording phase is to record every sound potentially useful in sound design processing and with the best possible quality. The quality of recordings depends in most part of the microphone type. Directivity of the microphone is also a particular problem to be solved. Using a more directional microphone generally leads to recording with a higher ratio of direct- to diffuse-sound field. The position of the microphones during the shooting of some scene is also a very important thing to be defined. The temptation in sound recording is to match the camera perspective for each new shot. In early sound recording there was an attempt to fit camera perspective,

shot -by-shot to what was seen. A wide master shot was thus more reverberant than the associated coles-ups. Then, when the scene was cut together, there was a very noticeable change in the amount of reverberation. Modern practice thus most often uses relatively small changes in the microphone perspective to correspond to large picture changes and the reverberation changes are consequently kept fairly subtle.

- **Mixing.** Production sound mixing involves microphone technique, recording, synchronisation, and has an impact of editing. Strictly technically speaking mixing is dynamically manipulating the level controls of the various microphones during the recording, taking for the purpose of emphasising the desired sound, and the converse. In the modern practice, mixing phase is not strictly connected to the recording phase. Nevertheless, it became the basic part of the sound editing. The term mixed sound (or final mix) relates today on the completed soundtrack of the movie.
- ***Synchronisation*.**Synchronisation today refers to the two basic terms. At the first place, it refers on the technique which enables the picture and sound to be in the same phase and to "move" synchronously. The second meaning relates on the process of later recording of the dialogues and sound effects (Foley) in studios, which couldn’t be recorded on the set with the appropriate quality. Even in the situations when the later recording of dialogues and sound effects were not needed, the synchronisation was necessary to avoid the problem which turned out during the process of making the film copies, which often caused the asynchrony between picture and sound. In todays practice these problems are overpassed with the new digital technology.
- **Editing** is the final step of sound design, and results in getting the final mix (or the soundtrack) of the movie. During this phase, all recorded sounds (speech, sound effects and music) are combined together to achieve the final "sound vision". To manipulate with the sound editors, use a mixture of types cuts and transitions, to get the final mix. The cuts which could be used in sound editing are vertical or diagonal. *Vertical cut* means that the audio wave form is chopped off instantaneously and is used only in situation when the amplitude

of sound is on the zero level. Vertical cut on any other non-matching level, will probably result in an audible click. *Diagonal cuts* are therefore favored for audio editing, with a typical crossfade time of one perforation on the film track, about 10 Ms., and are used routinely when a smooth transition is needed. *Fading in* and *out* is just the basic transition between the sound units. Today is present the dozens of different editing effects which could be used for over passing the discontinuity of sound in film.

4.0 CONCLUSION

This unit unit has dealt with the theories and practices of sound production for film and television, by examining several theories formulated by scholars in order to understand what sound is and how it is produced.

5.0 SUMMARY

There are various theories of sound used in the production of sound for both television and film. We can also analyse the practice of sound production for both television and film. There are some differences between recording sound for film and for television.

6.0 TUTOR-MARKED ASSIGNMENT

1. State and explain, at least, four theories of sound.
2. How does a spatial theory of sound explain the following? (i) that sounds are intrinsically spatial, or (ii) that auditory perception is intrinsically spatial.
3. Describe the process involved in sound production for film and television.

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MODULE 2

Unit 1 Components of Sound and Sound Recording Equipment

Unit 2 Applications and Challenges in Sound Recording

Unit 3 Understanding the TV Screen Space

Unit 4 Media Acquisition, Management and Organisation

Unit 5 Fundamental Principles in Editing

UNIT 1 COMPONENTS OF SOUND AND SOUND RECORDING EQUIPMENT

CONTENTS

1.0 INTRODUCTION

This unit of the module exposes you to various components of sound and how they

can be recorded. The use of various production equipment for recording both television and film sound will be learnt. You will learn about sound production in the studio and on location. You will learn about the items of equipment that are used in studio sound production and those used on outside location.

OBJECTIVES

By the end of this unit, you will be able to:

- explain various items of sound production equipment for film and television
- describe how these items of equipment are used for sound production.

3.0 MAIN CONTENT

3.1 What are Sound Components?

The key to good field audio is keeping the primary sounds as separate from the environmental sounds as possible in their elements. For example, you usually want to record the reporter's mic input on one audio track and the camera mic's input of primarily ambient sounds on the second audio track. There will nevertheless be circumstances in which you need to mix and balance several sound sources in the field. The variety of sound elements recorded during a production process and then edited together to create the rich stereo mix that we all know and love is what is often referred to as sound components. These elements include:

a. Dialogue,
b. Supporting Ambience,
c. Room Tone,
d. Environmental Ambience.

3.2 Capturing Sound Elements on Location

There are different practices and procedure to be adapted when capturing the various elements of sound. This is discussed below:

- **Recording Dialogue-** to record dialogues, use the camera-mounted mic,

lavaliers, and handheld mics when you go it alone. One very important detail every mic you use to record dialogue with is that it must be mono - all dialogue recording must be in mono! If you think that recording dialogue in stereo is better – it's actually not. Stereo dialogue recordings always sound funny in the mix and they don't play nice when mixed with mono dialogue recordings.

- **Recording Supporting Ambience** - This is audio recorded when shooting b-reel. It should be recorded properly whenever possible. Here are some things you can do to improve the quality of your supporting ambience tracks:
    a. Be quiet! Don't rifle through your camera bag when you hit record on a locked-off shot. It's a cacophony of zippers and Velcro.
    b. No talking! There's nothing worse than people talking when shooting b-reel. It renders the ambience useless. Camera ops and directors are the biggest offenders when it comes to chatting over b-reel ambience. Zip it!
    c. Be aware of the ambience around you. Listen for sounds that don't work with what you've got framed. People talking in the background can cause distractions and if an extraneous sound occurs while you're shooting, shoot it again! You'd shoot again if the camera move wasn't perfect.
    d. Make sure the ambience matches the frame. Long lens close-ups can be problematic if the audio 15 feet away doesn't match it. After you've finished with the long lens shot, move in and grab 15 seconds of ambience with the camera mic so you can replace it in editing.
    e. Make sure that sound-specific shots have usable sound. If you're shooting b-reel that has sound specific to that shot (a close-up of someone putting a golf ball), the sound needs to be usable. It's very difficult - if not impossible - to recreate these specific supporting ambient sounds in post.
- **Recording Room Tone-** Room tone is a dialogue-free recording of ambience that's crucial for smooth audio edits. The best time to record room tone is immediately after you're finished the dialogue recording so it sounds the same

as the ambience behind the on-camera dialogue. It's important to record with the same mic in the exact same position. For example: after an interview is completed, ask everyone to stay where they are and be quiet. Widen out your frame so it's easy to find the room tone recording during editing. Start recording and identify the track by saying "30 seconds of room tone". Record for a minimum of 30 seconds. Avoid the temptation to record room tone at the end of the day. It's not going to sound the same and chances are you'll forget until you're in the car on the way home.

- **Recording Environmental Ambience -** Environmental ambience anchors the entire sound mix. It will be in the final stereo mix the entire length of the finished production. Taking the time to record this element does take time away from shooting pretty pictures, but environmental ambience is an extremely important sound element. Record this ambience track separate from any shooting. It's for sound only. Use either the camera-mounted mic or a small portable field recorder like a Zoom H4N. Remember – what you're recording is deep background sound. Think in terms of this sound being 'out of focus'. For example, to record the environmental ambience element of a golf course, you'll need to move away from distinguishable sounds that are too specific (or 'in focus') – a noisy clubhouse, golfers talking loudly, course maintenance workers operating equipment, etc. You'd want to separate yourself from all these distinguishable sounds by walking out onto the golf course and finding a quiet place away from those sounds. Record a minimum of 2 minutes.

3.3 Sound Recording Equipment

The major equipment for sound production include- (1) the audio console, (2) the patch bay, and (3) the analog and digital tape-based and tapeless audio-recording systems.

a. Audio Consoles - Regardless of individual designs whether analog or digital, all *audio consoles,* or audio control boards, are built to perform five major functions:

i. **input**—select, pre-amplify, and control the volume of the various incoming signals;

ii. **mix**—combine and balance two or more incoming signals; quality

iii. **control**—manipulate the sound characteristics;

iv. **output**—route the combined signal to a specific output; and

v. **monitor**—route the output or specific sounds to a speaker or headphones so that they can be heard.

b. Patch Bay- The primary function of the *patch bay*, or patch panel, is connecting and routing audio signals to and from various pieces of equipment. You can accomplish this by using actual wires that establish specific connections, or with a computer that rearranges the signals and sends them according to your instructions. Whatever method you use, the principle of patching is the same. All patch bays connect the signal outputs (mics, CDs, VTRs) to specific input modules of the audio console. The patching is accomplished by connecting the audio outputs (top row) to the inputs (bottom row) with patch cords.

c. Recording Systems- analog and digital systems;

a. Analog recording systems- all analog recording systems are tape-based. Here we briefly touch on the two analog audio systems that are still in use: the open-reel audiotape recorder and the audiocassette recorder. The operational features of analog ATRs have been inherited by the digital recorders.

i. Open-reel audiotape recorder - the *open-reel*, formerly called reel-to-reel, *audiotape recorder* is generally used for multitrack recording or for playing back longer pieces of audio material. The ATR is also used to record material for archival purposes. Although a great variety of ATRs are used in television production, they all operate on common principles and with similar controls.

b. Tapeless Recording Systems- High-capacity, rugged hard drives

coupled with efficient compression systems such as *MP3* make disk-based systems the prime audio-recording medium in television production. The more popular systems include: (1) the digital cart system, (2) mini disks and flash memory devices, (3) hard drives with removable or fixed disks, and (4) optical disc systems with a variety of CD and DVD formats.

All professional ATRs, whether analog and digital, have, in addition to the switch for the various recording speeds, five control buttons that regulate the tape motion: (1) *play,* which moves the tape at the designated recording speed; (2) *fast-forward,* which advances the tape at high speed; (3) *stop,* which brakes the reels to a stop; (4) *rewind,* which rewinds the tape at high speed; and (5) *record,* which activates both the erase and the record heads.

3.4 Sound Production for Film and Video

Audio Control in the Studio

Most audio booths are separate from the program control section yet in close proximity to it. Some provide visual access to the studio or, at least, to the program control room. When walking into the audio booth, you will probably be surprised by the variety and the complexity of audio equipment, especially because we are generally unaware of the audio aspect of television unless something goes wrong.

Audio Control Booth

The *audio control booth*houses the audio, or mixing, console; analog and digital recording and playback equipment, such as cassette recorders, a reel-to-reel analog ATR, DAT recorders, an MD player, CD and/or DVD machines; and, largely for nostalgic reasons, a turntable. There is also a physical patch bay despite the presence of computer patching, and one or more desktop computers fulfilling various functions. You will also find cue and program speakers, intercom systems, a clock, and a line monitor. One audio engineer (or audio operator or audio technician) operates the audio controls during a show.

Basic Audio Operation

Learning to operate all this equipment takes time and practice. Fortunately, in most studio productions your audio tasks consist mostly of making sure that the voices of the news anchors or panel guests have acceptable volume levels and are relatively free of extraneous noise and that the sound appears with the pictures when video recordings are played. Most likely you will not be asked to do intricate sound manipulations during complex recording sessions— at least not right away. Consequently, the focus here is on the basic audio control factors: (1) audio system calibration, (2) volume control, and (3) live studio mixing.

Audio System Calibration

Before doing any serious volume adjustment or mixing, you need to make sure that the audio console and the VTR or any other device on which you are recording the audio "hear" in the same way, that is, that the VTR input volume (recording level) matches the console output (line-out signal). This process is called audio system calibration or simply *calibration.* To *calibrate* a system is to make all the VU meters (usually of the audio console and the record VTR) respond in the same way to a specific audio signal—the *control tone.* (Note that audio calibration has nothing to do with the zoom lens calibration, whereby you adjust the zoom lens so that it stays in focus during the entire zoom range.)

Steps in Audio Calibration

There are at least four main calibration steps audio engineer take in audio calibration. Here are the basic steps of audio calibration:

- With all faders on the console or mixer turned all the way down, activate the control tone, which is either a continuous tone or an intermittent beep. Most professional audio consoles and mixers have such a tone generator built-in.
- Bring up the master (line-out) fader on the console or mixer to the 0 VU mark.
- Bring up the fader for the control tone until the master (line-out) VU meter reads 0 VU. While bringing up the fader, you should hear the sound becoming

progressively louder until it has reached the 0 VU level.

- Now turn up the incoming volume control on the VTR until its VU meter also reads 0 VU. When both the master VU meter of the console or mixer and the VU meter of the VTR read the same 0 VU level, the system has been calibrated.

Audio Control in the Field

You usually do not need a mixer when doing ENG. You can plug the external mic into one of the camcorder audio inputs and plug the camera shotgun mic into the other audio input.

3.5 Using the AGC in ENG and EFP

Be especially conscious of the over modulation problem during ENG or EFP. When you are on an ENG assignment and cannot watch the VU meter on the camcorder, switch on the *automatic gain control* (AGC),which boosts low sounds and reduces high-volume sounds so that they conform to the acceptable volume range. The AGC does not discriminate between wanted and unwanted sounds, however; it faithfully boosts the sound of the passing truck and the coughing crewmember and even the noise of the pauses when the field reporter is thinking of something clever to say. But whenever possible, and especially when in noisy surroundings, switch off the AGC, take a level, and try to watch the audio levels. When using DAT, turn down the pot (volume control) a bit from where you had it while taking a level. This way you can be pretty sure not to over modulate once you are on the air.

Live EFP mixing

In EFP mixing there are always assignments for which you have to control more audio sources than the two microphones(mic.). Even a simple assignment such as covering the opening of the local elementary school's new gym will most likely require that you mix at least three microphones: the field reporter's mic, the lectern mic for the speeches, and a mic to pick up the school choir. If you run out of mic inputs on the mixer, you can always cover the choir with the camera mic.

Despite the number of mics, the mixing itself is fairlysimple. Once you have set the level for each input, you probably need to ride gain only for the reporter's mic during interviews and for the various speakers at the lectern. You may also want to bring up (increase the gain of) the choir mic during the performance. Although in an emergency you could try to pick up most of these sounds with the camera mic or by pointing a shotgun mic at the various areas, the multiple-mic setup and the portable mixer afford you better control.

Basic guidelines for live ENG/EFP mixing:

- Even if you have only a few inputs, label each one with what it controls, such as field reporter's mic, audience mic, and so forth. You would be surprised at how quickly you forget whose mic corresponds to which pot. In case you have to turn over the audio control to someone else, he or she can take over without long explanations.
- If you work with a separate VTR, calibrate the audio output of the camera with the audio input of the VTR.
- If you do a complicated mix in the field, protect your- self by feeding it not only to the camcorder and the VTR but also to a separate audio recorder for probable remixing in postproduction.
- If you feed the mixer line-out to the camcorder and a backup audio recorder, you must calibrate all of the equipment.
- Double-check all inputs from wireless mic systems— they have a tendency to malfunction just before the start of an event.
- If recording for postproduction, try to put distinctly different sound sources on separate audio tracks of the videotape, such as the reporter's and guests' voices on one track and the speaker's lectern mic and the choir on the other. That way it will be easier during postproduction *sweetening* (getting rid of unwanted noises and improving the sound quality) to balance the reporter's voice with the other sounds.

It **is usually easier to do complicated and subtle mixing** in postproduction rather

than live in the field. This does not mean that you should forgo filtering out as much un- wanted sound as possible during the on-location pickup, assuming that the mixer has some basic quality controls available. If it doesn't, don't worry. If any sweetening is to be done, do it in postproduction. Remember that the more attention you pay to good sound pickup in the field, the less time you need in postproduction.

4.0 CONCLUSION

it should be clear to you now, that there are various components of sound and the way in which they can be recorded. Various production itemsare also used for recording both television and film sound. The recording gadgets are useful for production in the studio and on location outside the studio.

5.0 SUMMARY

In this unit, you have learnt about the equipment for sound production for film and television. Also, you should be able to describe how these items of equipment are used for sound production.

6.0 TUTOR-MARKED ASSIGNMENT

1. List and describe the processes in audio calibration
2. What basic guidelines will you follow to achieve good sound mixing?

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UNIT 2 APPLICATIONS AND CHALLENGES IN SOUND RECORDING

CONTENTS

1.0 INTRODUCTION

This unit introduces you to the various challenges in film and television sound production. Here, you are guided to appreciate the challenges you are likely going to face as youperform studio and location recordings of sound.

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- identify the challenges of getting clean audio on location
- identify ways of overcoming these challenges
- perform basic operations in recording sound.

3.0 MAIN CONTENT

3.1 Sound Recording Challenges

There are several challenges that come with recording sound either in the studio or on location in the field. Some of these challenges are described below:

- **The A/C Trade off**

Expensive movie and TV sets have climate control that keeps noise far away from the actors and microphones. On location however, air conditioning becomes an issue, particularly when multiple bright lights are employed in a tight space. Sometimes the solution is to turn the A/C off during takes, but in particularly hot locations, this limitation can be impractical, or even cruel. Running the A/C while recording wreaks havoc on your audio, making ADR your only option.

- **Guerilla-Style Shooting**

Shooting your romantic leads eating ice cream while walking on a bridge in a bustling park can be a great way to capture the authentic flavor of your location. However, this scenario is an audio nightmare. The actors can wear the best lavaliere microphones and their voices can be picked up, but when you're shooting guerilla-style, a cry of "quiet on the set" accomplishes nothing. Without a doubt, barking dogs and screaming babies are going to spoil your takes, and ADR will be your best bet.

- **Uncooperative Costumes and Props**

A good costume designer can deliver a space suit; your actors may be able to deliver an Oscar-worthy performance as a nickel-plated robot, and authentic medieval weaponry and armor might add realism and heft, but all the aforementioned onscreen elements are going to interfere with dialogue recording. Rather than throw out great production value, most filmmakers would opt to shoot these scenes despite the sound problems. ADR saves many movies and TV episodes whose great visuals came at the cost of reliable dialogue recording.

While ADR may save the production (and the mixer), it comes at a cost both to the production and the actor. Having the actor come back for an additional day(s) of

work is not only costly but the actors dislike having to do it. That's why many actors have appreciated the convenience of Mobile Studio USA's mobile recording studio. The soundproof trailer is brought on location so the actor can conveniently record the necessary lines during a meal break or lighting setup. It saves the actor time, the production money, and the post supervisor another headache.

So when you encounter any of these challenges to capturing clean dialogue on location, you can rest easy knowing that ADR is an easy and accessible remedy.

3.2 Useful Tips on Recording Sound on Location

While musicians have access to state-of-the-art recording studios, many travel to record their tunes on location. Challenging perhaps, for producers to get the sound quality they need, the practice of recording on location is a rewarding way to make music. Moreover, there are many possibilities for recording music with top-notch production and great sounds that rival the studio setting. The following five methods are among the best ways to record in a non-studio setting.

1. Choose Location with Care

Many artists choose to record at a particular location due to its optimal acoustics.

Some rooms are known for their great drum sound while some locations may enhance vocals. If you're recording indoors, it's essential to prevent leakage from heating or cooling elements from through to your microphones and muddying the clarity of your recordings. While a lot of tweaking can be accomplished by editing with modern recording programs, it's somehow always better when you get that organically pure sound. Depending on whether you're recording a single musician or an orchestra, consider your location with care; discover its pros and cons before you fly the band in so you're ready to tackle any issues before they can detract from your recording process.

2. Field Recording

If you are in a situation where the natural sounds of your setting won't interfere and may even complement your live recording, you can opt for field recording. Ocean

waves might have more ambiance than the local airport, but there are many natural settings that can enhance the acoustics of a performance. Of course, if you are recording a band, it is still best to lay down vocal tracks separately. The various nuances of a vocal performance can easily be lost in a live recording situation even with the best of microphones. Of course, there's no harm in trying, but whenever possible, it's usually recommended to record vocals in isolation from other instruments to avoid muddied lyrics and so forth. Zoom Handheld Recorders are now popularly used for many types of field recordings.

3. Microphones—Best You Can Buy

There's always a lot of hype about various recording programs—the latest and greatest upgrades Pro Tools has to offer! However, no matter what program you choose, you can avoid a lot of editing headaches simply by recording with the best microphones for your recording situation. Stereo microphones and a minimum of leakage can allow you to capture a great recording outside of the studio. It'll take some time to set up the microphones to capture each instrument as perfectly as possible, but tweaking your microphone setup is one key method of getting the most out of a recorded performance.

4. Mobile Studio

At one time, you had to be as successful as the Rolling Stones to afford a portable studio. Today, there are many recorders you can easily move from place to place and remain well in budget. Today's technology will allow you to record with a laptop given the right software. Whether you are going with a minimum of gear or a bus-full of recording equipment, you can now bring the studio to just about any setting you want to record at.

5. Self-Recording Keyboards

Keyboards like the Korg MS-1 that specialise in sampling can also record music. You won't capture a lengthy performance the way you would with a laptop, but using an instrument-typically keyboards-that can record themselves along with other sounds is another interesting method to use when on location. Its built-in microphone is also handy and its editing capabilities and software make this particular keyboard ideal for recording situations.

4.0 CONCLUSION

There are some challenges involved in sound recording; the challenges can however, be overcome**.**

5.0 SUMMARY

Having gone through this unit, you are in the position to identify challenges of getting clean audio on location. You should be able to describe ways of overcoming these challenges. Also you ought to be able to perform basic operations in recording sound.

6.0 TUTOR-MARKED ASSIGNMENT

1. What challenges will you likely get in a location, studio shooting?
2. Based on lectures you have received, what useful tips can you give to a sound recordist?
3. What important steps will you take in mixing your sound for a movie?

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UNIT 3 UNDERSTANDING THE TV SCREEN SPACE

CONTENTS

1.0 INTRODUCTION

The main job of an editor is to translate what happens at event locations unto screen space. But event space differs from TV screen space. In this unit, you will be acquainted with the differences between event space and screen space. You will be able taught how to identify the characteristics of the screen space and explore why viewers understand visual stories told on the screen space. Finally, you will be taught how to identify the characteristics of camera shots and why these characteristics are important in visual story telling on the screen space.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- differentiate between screen space and event space
- describe the characteristics of screen space
- describe the characteristics of camera shots.

3.0 MAIN CONTENT

3.1 The TV Screen Space and the Event Space

An editor's challenge is usually how to translate event space to the screen space This is because there are marked differences between the two. These include:

a. Screen space has no depth, no physical distance, which only give an illusion of depth. Event space has depth and distance.
b. Screen space create margin round objects and restrains our view of the object. Event space does not create margins. The eyes see all that is in front of it.
c. Screen space is not Euclidean, what it shows changes its looks. Event space is Euclidean. What it sees does not change it looks.
d. It is not phenomena. Meaning in screen event is only abstract. Meaning in event space is not abstract but phenomena.
e. Screen event can change shape or size of objects. Event space does not change shape, size of image or object no matter where one stands to look at the event.
f. Screen space is constraint and concentrated. Event space is not.

All these suggest that objects and subjects which appear on the screen space are not the same as when they appear on the event space. When these objects and subjects are made to appear on the screen space, they do not only loose dimensionality and take a new perspective, but more importantly they take a new meaning. The event space is identified as a "visual world" and screen space as a "visual field". A visual world is undefined but a visual field is fixed and defined.

3.2 Characteristics of the Screen Space

Within the fixed and clearly defined space of the TV screen, there operate specific field forces that are quite different from those of an undefined space, such as our actual three-dimensional environment or location space. Some of these characteristics are:

- **Display size-** Sometimes called viewable image size or VIS, display size is the physical size of the area where pictures and videos are shown. The diagonal

length of the screen usually describes it. This size is limited and specific to a given television screen. A television display screen shows television images in three planes i.e. vertical, horizontal and diagonal planes. Although a film or television image cannot be categorized as oversized or undersized, it is true however that the sheer size of a television image has some aesthetic consequences. A large film image feels more overpowering than a small image of the same event. The larger image will definitely carry more aesthetic energy. But a large image must be shown on a large screen! Also, there are more details to an event if close up shots are used. This helps the viewer to look into the event through a series of details in the pictures.

- **Display resolution-** Display resolution refers to the number of pixels in each dimension on a display. All television sets have resolutions. When we talk about picture resolution, we are talking about the resolution of the television screen as well as the resolution of the source video like cameras, DVDs, cables etc. Both the source video resolution and the television screen resolution are important, and each can affect the other in defining the quality of the picture we see. A television screen resolution is defined by, the materials used in making the screen as well as those used in producing the pictures. If material resolution is too low, pixilation will occur on our display screen. If material resolution is too high, there will be motion sickness or artifacts. The two must be a commeasure.
- **Aspect Ratio**-This is the ratio of display width to display height. Television screens come in different ratios; 4:3, 16:9 etc. The former is no longer popular as television screens now use the 16:9 ratio found on High Definition Television sets. There are two types of aspect ratios: Original aspect ratio which is the dimension in which the film is originally produced and modified aspect ratio which is the dimensions in which the original film is altered to fit a particular screen. The wide screen ratio is popular amongst movie studios which scramble to make films on large screens that will do away with the dominance of television and introduce to movie goers a feeling that makes them part of an on- screen action.

- **Frame Rate-** All television screens have frame rates. Frame rates vary between Countries. This is because frame rate is tied to a Country's public power supply system. It is calculated by halving the frequency of a Country's power supply. Countries like Nigeria and other British Colonies whose power supply frequency is 50Hz (cps), we use television sets with 25 fps, while American countries use that with 30 fps because the frequency of their supply is 60Hz (cps). Sadly, the decisions on which aspect ratio or frame rate to use are not creative but based on the final distribution of the production or the technical limitations of the equipment being used.
- **Viewing angle-**When you are alone watching a television screen, there is perhaps a tendency for you to sit centrally facing the screen and so have no challenges to viewing angle. If a group of persons sit to watch the same screen, challenges exist because the quality of the television signal is affected by what angle of the television screen one sits to watch. All television sets have specification for viewing angles. Viewing angles are measured horizontally and vertically and indicate over what range, images on the screen are fully visible without the screen displaying a negative image. With less viewing angle, picture quality is lost. A viewing angle can be improved by adjusting wall mounts of a screen to make them tilt to a direction that offers better viewing experience.
- **Viewing distance** - This is the distance between the viewer and the television screen. Viewing distance is related to display size. Changing viewing distance is similar to changing television size. There are a number of factors that can affect the calculation and selection of a particular viewing distance. These are; human physiological considerations, technological limitations of television sets and the contents to be viewed. Technical limitations of television sets include the maximum detail perception of a television set and the high definition resolution materials on television sets. Maximum detail perception of a television set is mostly noticed on HD flat panel televisions sets. On these sets, the image is formed on a grid of tightly packed pixels. If this image is watched from a small distance, pixel lines or pixilation will appear on the screen.

3.3 Television Screen Forces

The television screen has some field forces that operate within its space. These forces are judged by the way our psycho-visuals see them. The judgment places the forces into the following:

- **Main directional field forces-** These are the horizontal line forces and the vertical line forces. The two forces reflect our normal world. Because we ordinarily move about in a horizontal world, and also spend a great portion of our lives in a horizontal position while sleeping, a horizontal placement within the screen, and horizontal lines, seems to suggest normalcy, calm, tranquility, and rest. Vertical space, on the other hand, is harder to manage.
- **Magnetism of the frame-** The edges of a television screen and especially the corners exert a strong pull on objects within its frame. Objects within the television screen seem to attract themselves. Also, the larger mass of object within a television frame is more independent than the smaller mass. All types of screen images occupying a relatively large screen area are usually more stable than the ones occupying a relatively small screen area.
- **Symmetry of the screen-** Human beings tend to pay more attention to an object when it is placed on one side of the screen than the other. Which side gets more attention is a subject of debate amongst television scholars. However, many scholars believe that human beings pay more attention to objects placed screen right than those placed on the left. This is because they say that a diagonal going from the bottom of the screen left to the top of the screen right is an uphill slant, while that going from top left to bottom right is a downhill slant. Naturally a downhill movement will be easier!
- **Figure-ground**- When confronted with any television picture, the human brain tends to organize the picture field into a stable ground against which less stable figures operate. We assign figure and ground depending on what we perceive.
- **Psychological closure -** Psychological closure is the mental fill- in -the gap in visual information to arrive at a complete manageable pattern and configuration. Human beings tend to organize screen pictures automatically

into patterns of simple geometrical figures such as squares, triangles and circles. They also fill in the gaps on pictures that are deliberately cut off on the screen. If this closure is positive, it is known as logical closure. If it is negative, it becomes an illogical closure.

- **Vectors -** Vectors are forces with magnitude and directions. In television, these forces are divided into graphic vectors, index vectors and motion vectors. Graphic vectors are stationary vectors that are arranged to lead the eye to a particular direction. The shot of a skyscraper will naturally make viewers follow its height and establish how tall it is. An index vector is that type of vector that is created by an object to point at an unquestionably specific direction. This could be the shot of a talent looking at a specific direction or pointing towards something to lead viewers to a specific object. Viewers are more likely to follow the talent's gaze or the pointing hand. A motion vector is a vector created by an object that is perceived to be moving on the screen.

Television screen forces help to shape the meaning of a media message.

3.4 Defining Camera Shots

Camera shots in videography can be described and understood in terms of the subjects of interest and their relationship with the camera lens. This relationship can be found in:

i. The relative distance between the camera and the subject,
ii. The camera angle relative to the subject,
iii. The camera movements relative to the subject or object.

Camera shots that are defined by the relative distance between the camera and objects and their aesthetic values include the following:

a. **Long Shot (LS)** is used to orient viewers to objects, subjects and settings by viewing them from a distance. It is referred more often in television production as establishment shot, wide shot or full shot. This shot places the camera in a sufficient position or distance to establish the setting, place and

time. It can be used to isolate a character. The shot when taken of a human being will be the full size picture of a man and his surroundings. It is usually taken with wide- angle lens that are locked (no camera movements). The only exception where camera movement is allowed is when taking POVs (point of view shots). POVs utilise moving crane shots, tracking shots, moving car shots or all kinds of dolly shots. In these types of shots, it is technically necessary to use the wide - angle lens so that one does not loose the action of the talent by framing too tight.

b. **Medium Shot (MS)** is a shot that provides approximately, a three-quarter view of the subject. Extremes between this shot in terms of camera distance with subjects or objects can be called medium long shot (MLS) or medium close up shot (MCU). It can also be used to describe a two shot or a three shot. In MCUs, blocking and body language tell the story.
c. **Close Up (CU)** shot describes the isolation of some elements in a shot usually involving the head and shoulders of a person in the case of human beings. Close up focuses and directs attention to create dramatic emphasis. CUs isolate for emotional clarity.

Extremes between these shots also exist. They are the **ECU, MLS, MCU** and the **ELS**. It must be noted that no one given shot is defined. Shots are ONLY defined when they are placed side by side each other. This is because a long shot in one take can be a medium shot in another and vice versa!

Camera shots defined by camera movements and the meaning they give to a visual story include; the pan, the zoom, the dolly and the tilts.

a. With a zoom, the audience's perception of the character changes.
b. With a dolly-in-move, the character's perception of something changes.

When we define camera shots by relative angles, we have shots like low angle, high angle and eye level shots.

a. An eye-level-shot tells us that there is little conflict in the scene. They make for more neutral interpretations and often seem more personal. Most romantic comedies are shot from this angle.
b. A low-level-shot helps to tell us that there are lots of conflict in the scene. It makes a subject to appear larger or taller than normal and so, more powerful.
c. A bird's eye-view-shot takes us out of the scene. It makes objects of interest to be smaller, less powerful than normal.

3.5 Characteristics of Camera Shots

Camera shots have both internal and external characteristics.

Internal Characteristics

- **Direction-** The television screen is horizontally oriented. That means most visual elements within the screen primarily move from side to side. This works fine for us since we've been accustomed to a horizontal orientation rather than a vertical one. Human Beings live, move and perceive on a horizontal plane rather than a vertical plane.
- **Picture Aspect Ratio-**All television images have aspect ratios. The importance of image ratios to television image perception has always been a source of concern to television scholars. Through their research they have discovered that, "This ratio is considered to give an ideally proportionate picture field which permits an easy framing of images in motion''. Most perceptual psychologists have argued that image aspect ratio has a definite perceptual, compositional and aesthetic implication.
- **Picture Size-** A television picture has a specific size relative to any given size of a screen. It has been suggested that the small size of the television screen has a definite aesthetic potential and communicative power which differs from that of the large screen. Since a picture field can only be displayed within the screen, it's important that we understand and discuss logically, the perceptual, compositional, and aesthetic meaning.

Internal Characteristics

- **Picture Direction-** A visual message should have a specific direction, whether horizontal or vertical, left or right, right or left, up or down, etc. If a visual message, (an event occurring within the visual field) is to be effective, it should clearly direct the flow of ac on for the viewer to follow. The establishment of the main direction, sometimes called continuity, is one of the principal spatial characteristics of the concentrated field.
- **Picture Proportion -** Picture Proportion is defined as the compositional principle dealing with the relationships of measure able spatial dimensions. It's usually classified into; Symmetrical proportion, where all the measure able spa al dimensions are equally distributed within the frame, and asymmetrical proportion, where these elements are not equally distributed. Here the emphasis is on how the various elements in a picture frame are composed so that they relate harmoniously together.
- **Picture Balance -** Various television scholars have defined balance in many ways. One definition says that, it is the state of distribution in which the graphic energy equalizes the elements of the moving image so that a continuing comfort is achieved. Whatever definition we choose to adopt; we should note that we're essentially comparing non-measurable elements here. It is therefore difficult to see them cancel themselves out as it were. Hence balance on compositional images can only be imagined to be stable, unstable, or neutral.

The knowledge of the characteristics of TV screen space, event space and camera shots is very essential to how an editor can edit a visual story that will eventually be shown on a TV screen space.

4.0 CONCLUSION

Event space is different from television screen space in certain ways. These differences are identifiable by different characteristics. Certain factors account for viewers' ability to understand visual stories told on the screen space.

5.0 SUMMARY

By now, you should be in a position to differentiate between screen space and event space. You should very well be able to describe the characteristics of screen space and be the characteristics of camera shots**.**

6.0 TUTOR-MARKED ASSIGNMENT

List and explain the characteristics of:

a. Screen space
b. Event space
c. Camera shots

7.0 REFERENCES/FUTHER READING

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UNIT 4 MEDIA ACQUISITION, MANAGEMENT AND ORGANISATION

CONTENTS

1.0 INTRODUCTION

In the previous unit, you learnt that the challenge of every film/video editor is how to translate information from an event space to a screen space. You also learnt that the screen space has its unique characteristics. This knowledge will equip you to appreciate the strengths and weaknesses of this medium of communication. You also learnt that camera shots have unique characteristics. These characteristics are useful in conveying the right information on the screen space. In this unit, you will learn the factors that determine how camera shots are acquired, managed and organised by editors.

2.0 OBJECTIVES

By the end of this unit , you will be able to:

- identify the factors that determine shot acquisition by film/video editors
- describe how camera shots are managed

- describe how camera shots are organised by an editing application.

3.0 MAIN CONTENT

3.1 Media Acquisition

This is an important process in editing because without the materials to work on, editing cannot be carried out. Media acquisition means getting the needed media to be edited. The media to be acquired are usually camera shots, audio recordings, photos and graphics which are necessary in conveying the information envisaged by the producer. In a non-linear editing system, the media comes on Digital tapes, Memory cards, Hard disk drives and Compact Disk drives etc.

Media Acquisition Factors

Media is not just acquired for the sake of acquiring them; there are factors that determine which media to acquire for an editing process. These factors include:

a. **Types of media-** media needed in an editing process usually comes in form of recorded video materials, recorded audio materials, recorded background music, photos, graphic designs and documents useful in a production.
b. **Aesthetic Meaning of media-** every production is intended to convey meaning envisaged by the producer to the audience. Therefore, for any materials to be acquired, there must be an aesthetic meaning that the shot provides in a story. How meaningful a shot is to a visual story is often determined by the judgement of both the producer and the editor of a visual story.
c. **Weight factors of media-** all camera shots have weights especially when they appear on the TV screen space as discussed in the characteristics of the screen space in unit 1.Weight in this context means the amount of attraction a shot gets from a viewer. The amount of weight (attraction) a shot carries is determined by weight factors such as:

i. Location-the weight of an object's shot is determined by the screen area where the shot is located. The shot can be located screen right or screen left. From our discussion on screen forces, especially the force of symmetry of the screen, we

noticed that object's shots located screen right have more aesthetic energy hence they have more weight.

ii. Orientation – camera shots can be taken either vertically or horizontally. Given the shots of an object, one taken horizontally and the other vertically, the vertical shot will have more weight than the horizontal shot of the same object.
iii. Contrast- contrast here means a shot that has objects which are strikingly different from other objects in it. For example, if in a shot of ten people, all the other people are black and only one person is while, the white person will attract more attention than the blacks. The same will also be true if all are white and only one person is black.
iv. Movement- objects that move across the screen have more attraction than those that are still. We see this often on our screen in scroll bars. Even though the text is usually small, viewers tend to pay more attention to them.
v. Colour- coloured objects that appear on the screen attract more attention than black and white objects.
vi. Size- object size has a lot to do with its weight in a shot. Bigger object sizes attract more attention than smaller sizes of the same objects.
vii. Shape – objects that have regular shapes attract more attention than those that have irregular shapes.

d. Duration of media- the media to be acquired must have the right amount of timing so as to comfortably complete a story. When the duration of media clips come short of this requirement, editors often shorten the story making the viewers to have an illogical closure on the story.

e. Relationship with other media- since editing visual stories means a number of shots together in a sequence, editors must ensure that shots acquired have a relationship with other shots to be used in a sequence. This relationship is often needed to provide graphic, spatial, temporal and rhythmic continuity in a story.

3.2 Media Management

Media management in editing means keeping record of the media acquired for an editing process and deciding on how to use the acquired media to tell a visual story.

Media management here therefore means, media logging and making edit decision lists.

a. **Media logging –** this is keeping a record of selected and acquired media to be used in an editing process. In the past (linear editing), logging was carried out on paper (hard copy) in a tabular form. Nowadays (nonlinear editing), this is carried out in the computer system's memory (soft copy). Regardless of where and how it is done, this record must contain the following components:
    i. Reel (tape) name- this refers to the medium upon which the material is recorded. It is done to identify where the shots are in the presence of so many other tapes.
    ii. Take- this is a particular selection from a number of shots of the same object.
    iii. Duration- how long a shot is from the start point to the end point.
    iv. Remarks- the editor's opinion of the selected shot. This usually comes inform of either bad or good.
    v. Description- description here means the type of shot i.e., long shot, close up etc.

Logging process is useful to an editor because; it enables him/her to:

a. Reduce time wastage during editing proper,
b. Edit even in the absence of the producer,
c. Discover missing shots and make arrangements for retake etc.
d. Prepare edit decision lists (EDLs).

b. **Edit Decision Lists (EDLs) -** these are records of the decisions an editor makes in an editing process. selected and acquired media to be used in an editing process. Like logging, these records were made on paper (hard copy) in the past (linear editing). Nowadays (nonlinear editing), this is carried out in the computer system's memory (soft copy). These records include:
    i. How different shots appear in a sequence,
    ii. How one shot transits to another,
    iii. What to do in case a shot is missing,

iv. What to do with a bad but necessary shot,

v. How to treat bad audio,

vi. How to treat bad colour balance etc.

3.3 Media Organisation

In editing, media organisation refers to the way media is captured and stored in an editing system. The way media organisation is carried out is very important because it determines the methods of access, efficiency, flexibility and storage devices to use. Media may be stored in different places, like DV tapes or on memory cards, on your PC or on an online cloud storage service. In nonlinear editing, media organization starts by capturing the media into the system drives of the computer.

Capturing media- this the transfer of media from tapes, memory cards, compact disks, etc. from other sources into the computer system drives. It means converting a media (media/audio) format to a format that is acceptable to your editing application. These formats are converted by the hardware or software digitizers available in an application program through a process called **compression** and **decompression** (CODEC). Editing applications are capable of converting and using many video file formats. These include, MPEG, WAV, WMA, H.264, etc. Some file formats eat up a lot of space, while others take just a few. This information helps you to decide which format to use. Also, some videos will be too long hence transferring them from one place to another takes a long time.

3.4 OrganisingMedia

There are simple ways of organising your media such that you can have easy access, efficiency of storage, flexibility of movement. To make it easier for you to store media files, most editing applications have what is called a project manager. This manager allows you to import and upload media files and organize them in a structure of your choice. For more secured media storage and management however, you might decide to dedicate a storage device which could be the system's hard drive, a portable drive or cloud drive.

There are several file folder structures that can be used to organize your files depending on what suites your work space. A few examples of these file folder structures are as follows:

A. For Reddit users, the file structure format like this can be used to organize your media files.

- 01_MEDIA
- 02_AUDIO
- 03_GFX
- 04_SFX
- 05_MUSIC
- 06_OUTPUTS
- 07_DOCS

Here, you can create a main folder for every new project and then dump this folder structure into it.

B. For Premiere Pro users, the file structure format shown below is also very good for you to organise your media files.

01 Project Files

- 01 Premiere (save your Premiere Pro Project Files here)
- 02 After Effects (save your After Effects Project Files here)
- You can also make a "03 Photoshop" or "04 Illustrator" if you happen to work with additional software as well.

02 Media

- 01 Video (Within this folder, I'll make additional folders like "01 Day 1" or "01 Card 1" etc.)
- 02 Audio
  - 01 Recorded Audio
  - 02 Music
  - You can also add a folder for SFX.
- 03 Photos

- 04 Graphics

03 Exports

- 01 AE Exports (For exported After Effects comps)
- 02 Rough Cuts (name like this, "01projectname_roughcut", "02projectname_roughcut" and so on).
- 03 Final Cuts (like this. "01projectname_finalcut", "02projectname_finalcut" and so on).

04 Documents

- 01 Model Releases
- 02 Scripts
- 03 Shot List
- You can also add additional folders if needed.

05 Final Assets

- Use this folder to place all final video assets, such as the final video export, thumbnails, closed captions etc.

You can adopt and use any of these files organising structures formats that suites your work flow.

4.0 CONCLUSION

Certain factors determine how camera shots are acquired, managed and organised by editors.

5.0 SUMMARY

This unit has taught you to identify the factors that determine shot acquisition by film/video editors; how camera shots are managed and how camera shots are organised by an editing application.

6.0 TUTOR-MARKED ASSIGNMENT

1. What is logging and why is it important to an editor?
2. List and explain the components of a typical log report.
3. What are EDLs and how are they formed?
4. Design a typical file organisational structure for a typical editing application.
5. Explain why file organisation is important in editing.

7.0 REFERENCES/FURTHER READING

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UNIT 5 FUNDAMENTAL PRINCIPLES IN EDITING

CONTENTS

1.0 INTRODUCTION

This unit introduces you to the basic principles in editing. The unit also exposes you to what continuity and complexity editing is. Here, the you will differentiate this by looking at examples of both continuity and complexity editing. You will also be exposed to sequences and sequencing patterns and analyse the use of sequences in a production. Finally, you will learn about editing applications work space and how the tools of the work space can be used to produce a visual sequence.

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- describe the principles in editing
- state the major differences between continuity and complexity editing
- state and explain the various sequencing patterns used by editors
- explain what is a six-shot sequencing pattern is and why it is mostly used by editors.

3.1 Principles in Editing

There are two basic editing principles - **continuity** and **complexity** editing.

- **Continuity editing** - is the most common principle in film editing. The purpose of continuity editing is to create the illusion of smooth continuous action and to help keep the audiences' attention to the story. The viewer will not notice the transition between shots. The continuity editing principle is characterised by the experience of a smoothly flowing, *seamless* narrative - one that is *visibly continuous* and where viewers tend not to notice the gaps and breaks of scene changes, editing, and subtitles. The continuity principle is geared towards maintaining engagement and reducing self- consciousness of the act of viewing. It is an editing principle or grammar for organizing shots with the goal of maintaining the viewer's **spatial** orientation and **temporal** orientation.
- **Complexity editing** is when shots are mismatched to disrupt the impression of time and space. It is a way that film producers and editors take a deeper look at the images they have recorded and intensify the action and energy of the footage. This does not focus on what the footage literally shows, but instead on a host of other aspects including visual and graphic elements and socio-political interpretations. This draws the audiences' attention to the process of cutting and disturbs the illusion of 'reality'. Its focus is on the **graphic** orientation and **rhythmic** orientation of the actors. The choice of which principle to adapt in editing a visual story is dependent upon the nature of the story. In most stories, producers can use the two principles simultaneously since in most stories, there is often the need to present **spatial** and t**emporal** realities as well as **graphic** and **rhythmic** realities!

Continuity and Complexity Editing Examples.

Continuity editing examples

The examples of how continuity editing can be done includes editing styles that:

- **Maintains axis of action-** in an editing style, which utilizes the 180° line of

axis, the idea of an “axis-of-action”: a clearly identifiable line in the 3D space of the scene down which all action, character movement, glances, and dialogue occurs is used. For example, in a dialogue scene involving two characters the axis-of-action joins the conversational partners. The director identifies this line by introducing a new scene with an Establishing Shot: a Full or Long Shot filmed perpendicular to the axis- of-action and far enough away from the main characters to show their positions relative to each other and their surroundings.

- **Is Analytical** - Once the space of the scene has been established the director can begin to break it down to tell the story (referred to as breakdown). The aim here is to give an ideal picture of the scene, in each case placing his camera in such a position that it records most effectively the particular piece of action or detail which is dramatically significant. This is achieved by cutting to shots filmed from different positions within the 180° arc and at different distances from the actors. Close-Up shots permit the audience to see more detail and, in a dialogue scene, read the expressions on the character’s faces. Drama emerges from the emotions, expressions, and thoughts portrayed in the character’s face.
- **Reverses angle- to maintain continuity,** editors only choose to cut between shots filmed perpendicular to the axis-of-action so that the lateral relationship of characters would be clear. The more commonly used sequence of shots here is referred to as Reverse-Angle Shots. These position the camera at, or near to, one end of the axis-of-action and point it at the other end. The camera is typically positioned either in place of the listening character or just behind their shoulder (an Over-The-Shoulder shot). Then, when the conversational turn passes to the other character, a cut is made to a camera positioned in exactly the same position relative to the other character (this shot combination is known as Shot/Reverse Shot).
- **Matches Exits/Entrances-** The preservation of spatial relationships is not only a concern of Over-The-Shoulder and Reverse-Angle shots it applies to all shots depicting action. If an actor or object is seen moving left-to-right across the screen in one shot, the next shot of their action should also present them

moving left-to-right. This is referred to as a “directional match”. It can be conceived as an axis of action extending beyond the confines of a single scene.

- **Cuts on Action-** As well as advising which shots to cut to and how to position cameras to create the least disruptive cuts, the continuity editing rules also suggest when to cut. Various rules exist for choosing the best time to cut but by far the most prominent is the match-action rule. When an editor wishes to cut between two shots of the same actor, the least disruptive time to cut is when action starts and when it ends.

Complexity editing examples

Examples of complexity editing includes:

- **Montage editing-**One of the most common utilisations of Complexity Editing are Montage sequences. You see these in movies all the time where there are many small clips cut together against music to illustrate something happening to the characters, such as them cleaning a house or falling in love. The idea here is that you put several separate images together that each mean something different, but when paired together end up with an entirely new meaning. This means that there is an entirely new effect that is created simply by adding all of these video clips together. This is a classic visual concept called the "Gestalt principle," which states that human perception will “create a whole from the sum of the parts."
- **Rhythmic Editing** -There are a variety of standard types of Complexity Editing that are commonly used to achieve certain goals. One is called "Rhythmic Editing" and is based on using the length of clips to maintain the energy of a sequence. If you cut from a very short clip to a longer one the pace can disappear, so instead of focusing on story continuity you cut together clips of equal length to maintain the feel that you are establishing.
- **Idea Associative Editing-** Another style is "Idea-Associative Editing," which is where two contrasting clips are cut together as a way of getting a new meaning. There are two main ways that this is done, and they are Comparison and Collision. Idea-Associative Comparison puts two images together to show how they may be similar, like showing an image of a stock broker on the phone

paired up to an image of a lion stalking his prey. Idea-Associative Collision wants to focus on showing the contrast between two things, like a wealthy businessman driving a Lexus against a homeless individual riding public transportation. Both of these are meant to illicit a response from the audience, but are not necessarily designed to move the story forward.

Rules for Visual Continuity

1. Ensure that you have good shot compositions
2. Have plenty cut- ins and cut- aways
3. Avoid jump cuts
4. Ensure action direction
5. Maintain symmetry of the screen

Guidelines in Visual Continuity Editing

1. Edits work best when they are motivated.
2. Keep in mind, the strengths and limitations of the medium.
3. Cut away from the scene the moment a visual statement is made.
4. Maintain action direction.

Continuity Shot Sequencing

Shot sequencing is the deliberate arrangement or ordering of story elements used in communicating the feelings or concerns embodied in the story organism. The concept of sequencing here is the type that excludes the kind of order that is merely piecing story elements together randomly such as would result if a blind man puts a set of story elements together or a seeing man puts a set of story elements together without looking. One of the first film producers who brought about continuity editing is Lev Kuleshov. He experimented with how camera shots can be used to provide visual continuity and hence designed a cause and effect theory of combining camera shots.Kuleshov asserted that for a story to make meaning, all shots that make up the story must relate one way or the other. This relationship according to him must be either **graphical**, **rhythmic**, **spatial** or **temporal.** Since in a film there could be many causes and effects, going forward therefore a sequence of this movement is produced.

3.2 Uses of Sequences

Sequences are very important in a visual story because:

a. They take you nearer to the focal point of the story
b. They provide a smooth flow or seamless continuity from the beginning to the end of the story.
c. When two or more sequences are put together, they make up the story duration.

Sequencing patterns

Good sequences result from a diverse mix of angles, distances from the subject and it's especially important to use variety in back-to-back shots. Together, specificity, anticipation and variety lead to strong sequences. There are many sequencing patterns editors can use in editing a visually continuous story. These are:

a. The two-shot sequence.
b. The three-shot sequence.
c. The five-shot sequence.
d. The six-shot sequence.

All these shot sequence patterns can be used to tell a visual story. However, the underlying principle here is to provide **anticipation** of action and reaction, spatial and temporal **continuity** and **time** compression. Many producers have adopted the six-shot sequence for visual story telling since this sequence pattern takes care of the issues that affect spatial and temporal continuities. The six-shot sequence proposed by Yoakam and Cremer, consists of six shots arranged logically in the following order: LS – MS –CU – CUT IN/CUT AWAYS - CU- MLS. According to the duo, the first shot should establish the location of the subject (**LS**). Shot two should be a medium shot of the subject (**MS**). The third shot should close up on the subject (**CU**). Shot four should then be a change in the angle of view to take care of continuity problems by preventing jump cuts and also enabling reactions to be observed by onlookers of the actions. This they say could be effectively done by introducing (**CUT –INS/CUT-AWAYS**). The fifth shot they argued should return to a close up of the subject (**CU**). The sixth shot which concludes the sequence should be a medium long shot of the subject (**MLS**).

3.3 Editing Work Space

All editing applications have a work space. In most applications, the work space is made up of the following: Project manager, Timeline, Program monitor and source monitor.

- **Timeline** – this is usually called the User Interface. It is where editing begins and ends. The timeline is made up of many video and audio tracks unto which audio and video can be laid in a sequence. The timeline has tools which are used in the editing processes. Some of these tools are; the cut tool, the play line, etc.
- **Project manager-** this is where assets are kept to be used in editing. The assets include; the ones provided by the editing application and those captured or imported by the user.
- **Program monitor** – the program monitor is used to monitor what is done on the timeline. The status of the timeline is therefore what appears on the program monitor.
- **Source monitor** – this gives the editor to observe what is on the source monitor before taking it to the timeline to be monitored by the program monitor.

Editing Functions

These are basically what determine the transitions between one shot and the other, how one shot ends and the other starts. In film editing, many editing functions are used to achieve this transition from one shot to another. Some of these editing functions are: Cuts, Dissolve, Wipe, Fade Etc.

The most commonly used editing functions are the Cut and the Dissolve.

The Cut- An instantaneous change from one shot to another.

- It does not exist (it is not visible).
- Used to manipulate and construct screen space, density.
- It does not occupy its own screen space and time.
- It takes shorter time to execute.
- It is used to bridge shorter intervals of time.
- It is used to bridge smaller interval of space.

- It is used to maintain event rhythm.

The dissolve- A gradual transition from shot to shot in which the two images temporarily overlap.

- The dissolve is visible
- Influence our perception of screen time and event rhythm.
- Suggests a thematic or structural relationship between two events.
- It takes longer time to execute.
- Used to bridge longer interval of time/space.

4.0 CONCLUSION

We have examined the basic principles in editing. We have considered sequences and sequencing patterns, the use of sequences in production editing applications, work space and how the tools of the work space can be used to produce a visual sequence.

5.0 SUMMARY

By now, you should be able to describe the principles in editing,state the major differences between continuity and complexity editing, explain the various sequencing patterns used by editors and explain what a six-shot sequencing pattern is and why it is mostly used by editors.

6.0 TUTOR-MARKED ASSIGNMENT

1. Describe the two principles in editing.
2. State the major differences between continuity and complexity editing.
3. State and explain the various sequencing patterns used by editors.
4. a.What is a six-shot sequencing pattern

b. Why is it mostly used by editors?

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MODULE 3

Unit 1 Introduction to Cinematography
Unit 2 Camera Types, Parts, Accessories and Camera Image Formation Process and Capabilities
Unit 3 Techniques of Cinematography

UNIT 1 INTRODUCTION TO CINEMATOGRAPHY

CONTENTS

1.0 INTRODUCTION

In this unit, you will learn and understand what is meant by cinematography. In doing this, you will trace the evolution of cinematography and get to know those behind its development and the various contributions from individuals/groups involved.

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- define cinematography
- explain the processes and techniques of cinematography
- describes the process of camera image formation

- explain the evolution of still photography which gave birth to the motion picture camera, the video camera
- state the genesis of cinematography
- identify key players in motion picture development.

3.0 MAIN CONTENT

3.1 What is Cinematography?

Cinematography is the art of motion picture photography or making a film using a film camera to record pictures on a light sensitive film stock chemically or electronically on to an image sensor in a video camera. The art of cinematography deals largely with lighting and how images are captured. In telling a visual story, cinematography uses images as expressively as writers use words. The choice of what to show to an audience and how to show it is largely embedded in the power of visualisation. The art of motion picture photography usually referred to as cinematography takes us back to the first 100 years of cinema development when pictures were produced via a photo-chemical process. Let's take a stroll down the memory lane and educate ourselves how it all started.

3.2 History of Camera Evolution/Pioneers andtheir Contributions

- The camera Obscura was the earliest photographic camera which was basically a dark box with a small hole which formed an inverted image on the surface opposite the opening. These "dark chambers" as they were known had a small opening called a pinhole which allowed light into the chamber. The image of the scene was then projected onto the opposite wall. Abu Ali Hassan Ibn al Haitham an Iraqi also known as Alhazen is acknowledged with the invention of the camera Obscura.
- Various scientists carried out experiments to improve the camera obscura. Joseph Niepce and Louis Daguerre unveiled the Daguerreotype of camera in 1839.
- Photographer Eadweard Muybridge shot still photographs to create movement of a running horse using a Zoopraxiescope.

- Louis Le prince, inventor of an early motion picture camera was the first person to shoot a moving picture sequence using a single lens camera and a strip of film.
- George Eastman introduced the celluloid film in 1889 having invented the "Kodak" camera.
- The Kodak Brownie, Leica, Polaroid and NIKONF cameras were the first single lens Reflex cameras (SLR).
- Cameras evolved from the camera Obscura, through many generations of photographic technology.
- Daguerreotypes, Calottypes, Dry Plates, film to the modern day digital cameras The illusion of motion pictures is based on persistence of vision and the phi phenomenon. persistence of vision- the brain holds an image for a few seconds after it's gone.
- Phi phenomenon- the eye perceives two lights flashing on and off as one light moving. This rapid succession of individual images creates the illusion of motion.
- The Lumiere, Brothers, Auguste and Louis are credited with inventing the first motion picture camera. This was a portable motion picture camera, a film processing unit and a projector, a basic three- in- one functional invention called the Cinematographe.
- In 1891 Edison company produced a Kinetoscope which only one person could view pictures at a time.
- In 1896 Edison produced the first commercially successful projector.

3.3 Key Players in Camera/Motion Picture Development History

The key players in camera and motion picture development are:

- Auguste& Louis Lumiere
- Thomas Edison
- Edweard Muybridge
- George Eastmann

In his book, the "Language of Film", Rod Whitaker talks about *Genesis: The Inevitable Machine* while making an inquiry into the real inventor of the camera.

> ‘There is no reasonable doubt but that the credit for invention of the motion picture goes to the wizard of Menlo Park. It was Eadweard Muybridge who really invented the motion picture. The laurels for the invention of the motion picture must be placed on the brow of Etienne Jules Marey. W.K. Laurie Dickson invented the motion picture. Max Skladanowsky invented the motion picture. Louis Le Prince (tragic and mystic figure) invented the motion picture. William Friese- Greene invented the motion picture. What about the Lumiere boys’? (Whitaker p.8).

Such has been the scholarly hassle to place the technological credit for the film upon some one person, the yardstick to determine the inventor of motion pictures was based on several parameters as to who was the first to achieve: stroboscopic effect, strip film, Maltese Cross, shutter-shuttle assemblies, projection, paying audiences and existing filmic evidence. Notwithstanding these contentions, the many scientific, artistic and mechanical midwives of the motion picture technology in their unique ways contributed to the growth of what we refer to as cinema today.

4.0 CONCLUSION

In this unit, we have explained cinematography. We have traced the evolution of cinematography and its development and the various contributions from individuals/groups involved.

5.0 SUMMARY

By now, you should be able to explain what cinematography is and explain the processes and techniques of cinematography. You should be able to describe the process of camera image formation, explain the evolution of still photography which gave birth to the motion picture camera, state the genesis of cinematography and identify key players in motion picture development.

6.0 TUTOR-MARKED ASSIGNMENT

1. The camera Obscura was an offshoot of the pinhole camera. How would you compare the camera Obscura with the modern day still photographic camera?
2. What contributions did the following make towards the development of motion picture photography?

a. Thomas Edison
b. Joseph Niepce
c. Louis Daguerre
d. EadweardMuybrisge

3. What do you understand by the term “persistence of vision” and phi-phenomenon?

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UNIT 2 CAMERA TYPES, PARTS, ACCESSORIES AND CAMERA IMAGE FORMATION PROCESS AND CAPABILITIES

CONTENTS

1.0 INTRODUCTION

This unit will focus on learning the various camera parts- cine and video, how photographic images are formed, camera shots and the techniques in camera operation

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- describe the parts and functions of the cine/video camera and the importance of the lens in cinematographic work
- describe how photographic images are formed on film/video tape
- explain what single and double system shooting is.

3.0 MAIN CONTENT

3.1 The Motion Picture Cine Camera

- The body
- The film transport system
- Lens + lens shade
- Shutter
- View finder
- Focusing ring
- The intermittent movement- the claw pulls down each frame of film along the film gate for any exposure to be made
- Power belt battery

  Refer to www.https://en.m.wikipedia.org>wiki>movi.....

Most cameras today have a reflex lens system. Through the lens focusing (TTL) enables the camera operator to see correctly/exactly what the lens see through the camera view finder.

3.2 Video Camera Parts

- Body
- View finder
- LCD - liquid crystal display
- Power switch on/off
- Lens- manual/auto
- Focusing ring
- White/black balance
- Filter wheel selection control
- Built in microphone/external microphone port
- Lens shade
- Clip on batteries

  Refer to www.https://iconiccamera.com>parts-of-a-vid.....

3.3 The Camera

The film (cine) and video cameras share many common features. The camera body for instance houses basic components such as the mechanism that moves the film from the feed to take up spool or magazine via the intermittent movement of the claw; the rotating shutter opens and closes as the film passes through the film gate for exposure to light coming in through the lens. The intensity of light which reaches the film is controlled by a variable- sized aperture (iris) which uses interlocking leaves and is built into the lens. The size of the aperture is called f-stop or f-number. This f-number determines the amount of light that enters the lens for the exposure of images. The lens is calibrated in this manner;

f1, f1.4, f2, f2.8, f4, f5.6, f8, f11, f16, f22.

The smaller the f number the wider the opening of the aperture (iris) to allow light into the lens; conversely, the higher the f-number, the smaller the opening of the aperture. The Lens is a transparent medium usually a glass bounded by two surfaces usually curved. The Lens is referred to as the eye of the camera. It is the most important part of the camera. It is an optical device which focuses light by refraction. This broad description covers all lenses used for the collection, transmission and focusing of light rays.

Recording of Pictures on Film (Cine)

Raw stock is film that has not been exposed or processed. This is a chemical component loaded in a cine camera which when exposed to light through the lens, the grains which are spread out in a chemical suspension of the strip of film plastic undergo a chemical reaction. Once this process is completed with the images recorded, the latent image on the film is taken to the laboratory where it is developed into a positive image in printing.

Video Recording

Whereas the traditional movie camera (cine) records images on film, the video camera forms its image from light coming through the lens onto a semi- conductor image sensor. The sensor which is a charge coupled device (CCD) measures light with half-inch tiny sensitive diodes known as photo sites. This enables a video camera to record images electronically onto a video tape, memory stick or card which can be previewed

immediately after the shot has been taken via a built in VTR tape recorder player on any playback facility with the necessary facility for play back.

Recording Sound on Film/Synchronisation

Film sound synchronisation is achieved in two ways namely:

- Single system shooting – both picture and sound are recorded on the same piece of film. Usually, the sound is recorded on the edge of the original motion picture film either on a negative or reversal film stock.
- Double system shooting- this is where the synchronous sound and images are recorded on separate materials. While the camera records the picture only, the tape recorder (Nagra) records sound. The slate or clapperboard is used as a mark for identification where both the picture and sound are in sync.

The technological revolution brought about in digital film making is responsible for the changes in the whole gamut of traditional film making approach over the years whereby, film stock which is exposed in the cine camera is taken to the laboratory for developing and printing. Today's technology has ushered in versatile and user friendly tools that make static memory devices (sticks and cards) very ideal for capturing images. Some common features found on standard definition and high definition cameras include: -

Camera Parts

There are 10 basic **camera parts** to identify in today's digital world. Whether you have a digital compact or a digital SLR, these parts will inevitably be found on most cameras.

- **Lens**

  The lens is one of the most vital parts of a camera. The light enters through the lens, and this is where the photo process begins. Lenses can be either fixed permanently to the body or interchangeable. They can also vary in focal length, aperture, and other details.

- **View Finder**

  The viewfinder can be found on all DSLRs and some models of digital compacts. On DSLRs, it will be the main visual source for image-taking, but

many of today's digital compacts have replaced the typical viewfinder with an LCD screen.

- **Body**

  The body is the main portion of the camera, and bodies can be a number of different shapes and sizes. DSLRs tend to be larger bodied and a bit heavier, while there are other consumer cameras that are a conveniently smaller size and even able to fit into a pocket.

- **Shutter Releases**

  The shutter release button is the mechanism that "releases" the shutter and therefore enables the ability to capture the image. The length of time the shutter is left open or "exposed" is determined by the shutter speed.

- **Aperture**

  The aperture affects the image's exposure by changing the diameter of the lens opening, which controls the amount of light reaching the image sensor. Some digital compacts will have a fixed aperture lens, but most of today's compact cameras have at least a small aperture range. This range will be expressed in f/stops. For DSLRs, the lens will vary on f/stop limits, but is usually easily defined by reading the side of the lens. There will be a set of numbers stating the f/stop or f/stop range, e.g. f/2.8 or f/3.5-5.6.- this will be your lowest settings available with that lens.

- **Image Sensor**

  The image sensor converts the optical image to an electronic signal, which is then sent to your memory card. There are two main types of image sensors that are used in most digitals cameras: CMOS and CCD. Both forms of the sensor accomplish the same task, but each has a different method of performance.

Camera Parts

The memory card stores all of the image information, and they range in size and speed capacity. The main types of memory cards available are CF and SD cards, and cameras vary on which type that they require.

- **LCD Screen**

The LCD screen is found on the back of the body and can vary in size. On digital compact cameras, the LCD has typically begun to replace the viewfinder completely. On DSLRs, the LCD is mainly for viewing photos after shooting, but some cameras do have a “live mode” as well.

- **Flash**

  The on-board flash is available on all cameras except some professional grade DSLRs. It can sometimes be useful to provide a bit of extra light during dim, low light situations.

- **User Controls**

  The controls on each camera will vary depending on the model and type. Your basic digital compacts may only have auto settings that can be used for different environments, while a DSLR will have numerous controls for auto and manual shooting along with custom settings.

3.4 Camera Accessories

There are several ways you can obtain better pictures and sound quality in your production.

- Tripod- This is a three-legged camera stand to ensure image stabilisation while shooting. A mono pod, a one-legged stand can also serve in very tight, crowded areas.
- Audio- To take care of your sound recording you need different types of microphones to use at different locations as desired- Omni directional, unidirectional bi-directional etc.
- Lighting equipment- For clarity & effects lighting
- Lenses- Prime lens, zoom lens, lens hood
- Lens adopters- for interchangeable lens
- Lens filters/ colour correction filters, sky filters etc
- Camera stabilisation& movement – medium camera slider, steadi-cam dolly wheels
- External monitor/and play back recorder
- Memory cards, batteries

4.0 CONCLUSION

It should be very clear to you now, that the camera has various parts and there are various techniques in camera operation.

5.0 SUMMARY

Now, you should be able to identify and describe the parts and functions of the cine/video camera; explain the importance of the lens in cinematographic work; describe how photographic images are formed on film/video tape and also explain what single and double system shooting is.

6.0 TUTOR-MARKED ASSIGNMENT

1. With the lens fixed on a camera, go through the lens opening from f1, f1.8, f2 …. F22 while looking into the view finder or LCD for each setting write down your findings with regards to image clarity
2. Observe both the cine video cameras, briefly describe their common features.
3. Differentiate the image forming capabilities of the cine and video cameras.

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UNIT 3 TECHNIQUES OF CINEMATOGRAPHY

CONTENTS

1.0 INTRODUCTION

In this unit, we are going to focus our attention on the techniques involved in camera operation. You will learn how to use your camera shots to persuasively communicate to your viewing audience. We will discuss the basics of a good picture making as you will be taught the rudiments of lighting, exposure control, pictorial composition, the different types of shots and the psychology of camera angles and viewpoint. This unit will also expose you to camera mounts and movements, directional continuity and the 180 rule also known as crossing the imaginary line of axis.

2.0 OBJECTIVES

By the end of this unit , you will be able to:

- describe the visualisation process in terms of shots, camera angles and view points
- explain the different camera movements and camera mounts

- demonstrate pictorial composition, essential area, rule of thirds, directional continuity using the 180-rule crossing the imaginary line of axis, lens perspective- depth of field, zoom lens, macro lens, telephoto lens etc
- explain and discuss the different types of lighting and their effects on a subject.

3.0 MAIN CONTENT

3.1 Visualisation and Types of Shots

Every production starts with the visualisation of key shots. Visualisation can be defined as the creative process of translating abstract ideas, thoughts and feelings into concrete images. This demands strong conceptualisation, skills and a thorough understanding of media production methods and techniques. The visualisation process includes an analysis of the types of shots possible, composing those shots, and deciding how to combine the shots visually and with the proper sounds into a comprehensive whole.

3.2 Field of View/ Types of Shots

For you to expressively convey meaningfully to your audience, there must be some way of expressing each shot type that might be required.

Extreme Long Shot (ELS). This a very wide shot what covers more than the subject matter visible in the frame. Typically used to show subjects of relatively massive scale.

Long Shot (LS).A shot in which the camera is set at a distance that allows the general recognition of the subject matter but prevents the identification of small points of detail. (e.g. A crowd shown without it being possible to identify an individual face). The distance of the camera from its subject also reflects an emotional distance; the audience does not get emotionally involved in what's going on as they would if they were closer.

Medium Shot (MS).A shot mid-way between a long shot and a close-up. Also known as a mid-shot this shot is more informative. It may also be called a waist shot because the frame cuts off the human figure just below the waist.

Close-Up (CU). About one third of the subject matter is seen in the frame- a head and shoulder shot.

Extreme Close Up (ECU). This is purely a detailed shot. The framing favors one aspect of a subject such as his or her eyes, mouth, ear or hand may be a magnification of any object or item or merely just a part of an object or item.

The camera angle otherwise view point is used to establish a specific view point such as to involve the audience in sharing a particular character's perspective on the action. It is the relative position of the camera when compared with an eye-level view at a normal distance. In the latter, context, the view is said to be high, low, near or distant. The goal may be to enhance identification with the person's psychological or philosophical point of view. The view point you select to show a character is an important tool at your disposal. The communicative effect of each shot is quite distinct as it describes the importance of character, his relationship with others in the same scene, his state of mind or his immediate intention.

Point of View (POV). This is a shot that the camera angle gives the impression of the view of someone in the scene. It is a shot that takes on a subjective stance. The camera records exactly what one of the characters is seeing. The camera sits in place of the talent, and what it shows to the viewing audience is supposed to represent what the character is actually seeing.

Over-the-shoulder (OTS) shot. This is a two- shot from behind one of the subjects who is facing the other subjects. The shots are often used when recording dialogue between two people. Generally, the framing is a medium shot.

Reverse-angle shot- the camera is placed in exactly the opposite direction of the previous shot (OTS). The camera is moved in a 180 degree are from the shot immediately preceding it.

Normal view point- eye level: the camera height is that of the eye level of the actor either objective or subjective.

High angle- the camera looks down on a character. The high angle shot diminishes the strength and importance of the character. It portrays the character as weak, vulnerable subordination, inferiority and subjugation.

Low angle- the cinema is placed down looking up to the character. This shot increases audience importance of the actor; actor appears dominating in position, power, authority, victory e.t.c.

Artistically, a chosen camera angle and placement (position) in terms of height enables the director of photography to impress on his audience the significance of his pictorial message.

Objective camera angle – people photographed from this view point do not look directly into to camera lens. This is the audience point of view. Most motion picture films are shot from the objective point of view.

Subjective point of view- puts both the audience and the actors together as if they are participants on the screen. See the effect of a newscaster looking directly into the camera lens during a news cast vis-à-vis you as a viewer.

Camera Movement

There are four main types of camera movement;

- **Pan** – in a pan shot, the camera rotates horizontally around a fixed position. (often used to follow movement)
- **Tilt-** a tilt shot moves the camera vertically (up or down) around a fixed position.
- T**racking**- this is the lateral movement of the camera in which it changes location, usually fitted to a device called a dolly that runs on rails.
- **Dolly**- a camera support that enables the camera to move in all directions- to move the camera forward/ towards a subject = dolly in or away from subject = dolly back or dolly out.

Camera Mounts

A stable, static camera will always be the basic standard for professional- looking shots.

Tripod- the basic standard camera mount is the tripod. This is a three- legged support for a camera

Monopod- a single leg camera stand

Dolly- an easily moved wheeled vehicle used to support a camera during shooting. The moving of a camera on a dolly or camera truck during shooting.

Pedestal- studio pedestal can support heavy studio camera and permit extremely smooth camera movements. The camera on a pedestal can be raised and lowered during production.

The Steadicam mount enables the camera operator to even run with the camera while keeping the pictures perfectly steady. This is achieved because a Steadicam is a camera mount with built in springs which hold the camera steady while the operator moves.

3.3 Pictorial Composition

The arrangement of visual elements or content within a shot is known as composition. Good camera work begins with composition. In other words, the screen space used for your presentation that is the picture frame is determined during production by the viewfinder boundaries and the space within those boundaries. The placement of various objects, settings and characters within the boundaries of the frame is your shot composition. The essential area of a shot is the area of importance or attraction that you want to focus the attention of your audience. It is like saying to them "this is what I want you to see".

Rule of Thirds

The basic principles behind the rule of thirds, is to imagine breaking an image down into thirds i.e. both horizontally and vertically so that you have nine parts as shown here:

Faming rule of thirds

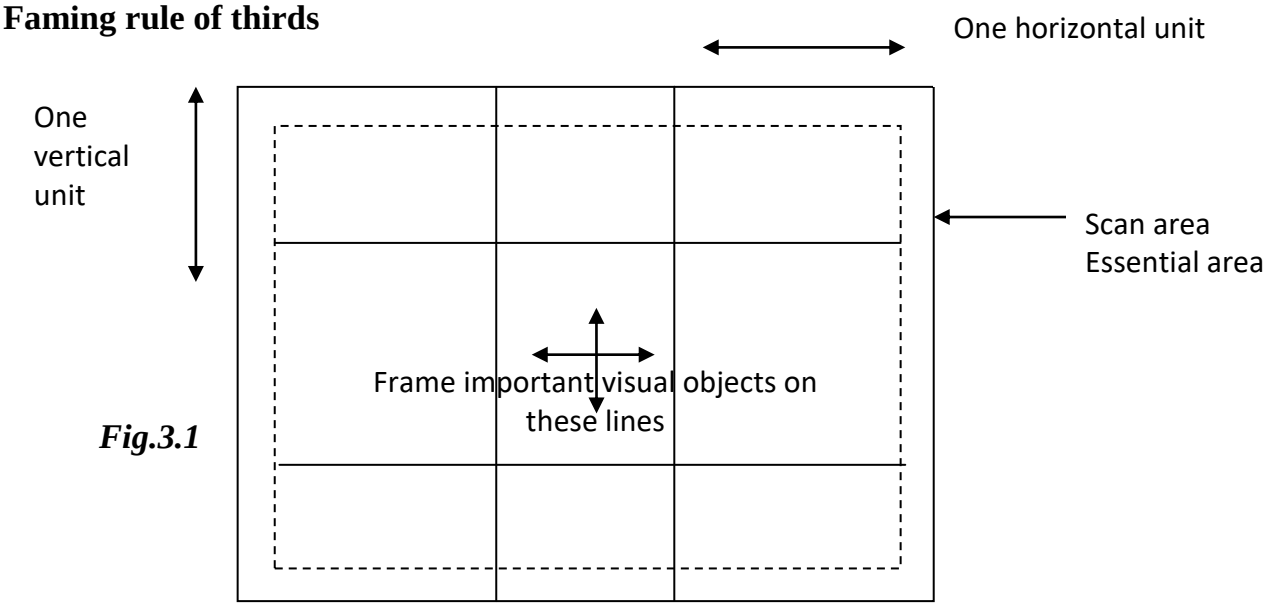

Fig.3.1

The rule of thirds divides the frame into nine areas by drawing two vertical lines one-third of the way in from each side and two horizontal lines one- third of the way from the bottom and the top of the frame. From this diagram, you can position your character left or right of the screen either static or in motion giving more space i.e. looking room, lead room or nose room in front of the subject. You also need to leave some space on top of the frame- this is known as head room.

180- Degree Axis of Action Rule

The 180- degree rule of camera placement ensures directional consistency from shot to shot. The 180- degree rule deals with any framed spatial left-to-right or right-to-left relationship between a character and another character or object. It is used to maintain consistent screen direction between the characters or between a character and an object, within the rule established spa

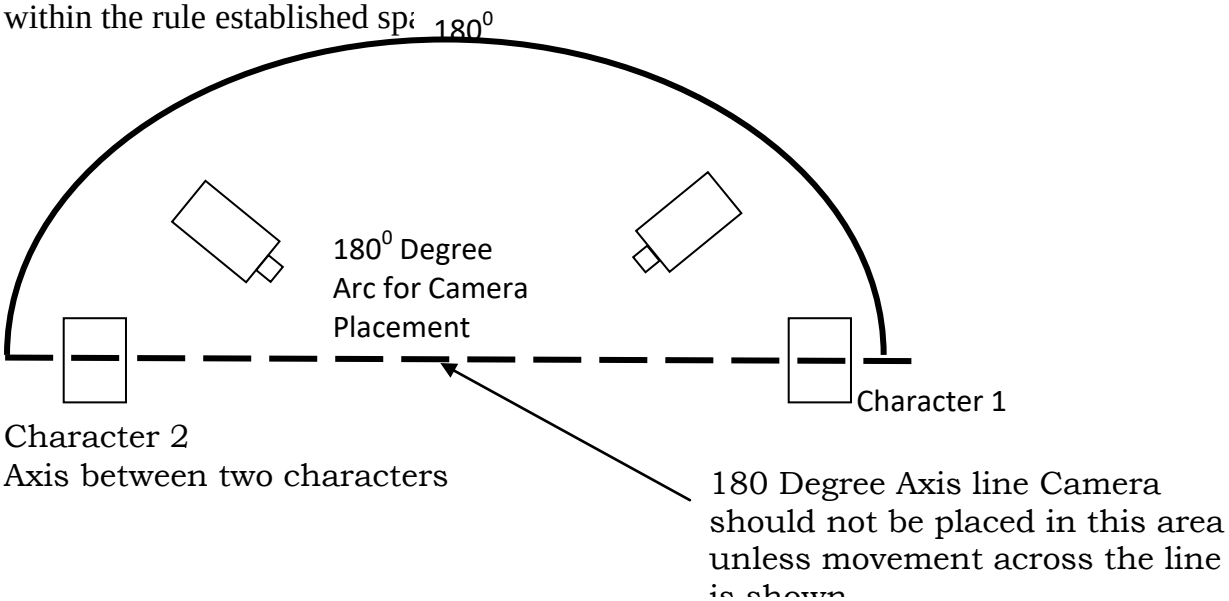

Fig.3.2

Importance of Establishing Direction

The directions in which a person or vehicle moves or the direction in which a person looks can cause the most vexing problems in motion picture continuity. Since a motion picture is made up of many shots filmed from different camera angles and put together in a sequence- a series of shots, if an established move or look in a particular direction is unaccountably changed in consecutive shots, the picture's continuity will be disrupted and the audience will be distracted or even confused

Screen Direction

There are two types of screen directions: dynamic and static-

Dynamic- movement of person(s) right to left or left to right

Static – this is concerned with the way in which characters face and look on the screen. There is need to indicate looking room in shot composition as experienced in subjective/ over-the-shoulder shots

Lens Perspective

The camera lens is the eye of the camera. The lens determines what the camera can see. Different types of lenses also determine the basic visual perspective- whether you see an object as distorted or whether you to perceive more or less distance between objects than there really is. Lenses are grouped according to their focal lengths in three main categories:

Short: For Wide Angle Lenses

Wide-angle lens: a lens comes into the category of wide angle when the image that it forms takes in more of any given subject than does the average eye of the average person. The wide angle lens is a short focal length lens that provides a broad vista of a scene. The wide angle lenses are well known for their apparent ability to exaggerate the comparative sizes of near and distant subjects and to produce dramatically converging horizontal and vertical lines.

Normal: For Medium Angle Lenses

Standard lenses- these are normal lenses that provide images of the world "as it is" to the average seeing eye of the average person. The essential quality of this lens is that

it will produce an image that matches what the average eye sees in terms of angle, clarity and relationship of shapes, sizes and textures.

Long: For Narrow Angle Lenses

Narrow angle lenses: has a narrow field of view and it enlarges the objects in the background. This is a zoom lens in a telephoto position. It is exactly the opposite of the wide-angle lens which increases the distance between objects. The narrow-angle lens seems to compress the space between objects at different distances from the camera.

Zoom Lens. This is a variable focal- length-lens. It can gradually change from a wide shot to a close-up and vice versa in a continuous move. The focal length of a lens determines how wide or narrow a vista the camera can show and how much and how close or far away the subject seems to be away from the camera. Zoom lenses have a variable focal length whose major positions are wide-angle, normal and marrow angle (telephoto)

Macro Lens- when the lens is shifted to the macro on a zoom lens, it is possible for the lens to focus on an object at a very close range. It is used to take shots of very small objects at a close range.

Depth of Field- the depth of field of lens is the range of acceptable sharpness before and behind the plane of focus obtained in the final screen image. Depth of field is dependent on a number of variable factors: the focal length of the lens, the aperture setting, and the lens/subject distance. The depth of field increases when a.) the aperture is reduced, given a constant focal length and subject distance. b.) the camera moves away from the subject with no change in focal length and aperture. c.) the focal length decreases with the aperture and subject distance constant.

F/numbers, T/stops- F numbers are the graduation given to indicate how much light an aperture will allow through the lens. Any f/ number is the ratio of the effective or working aperture to the focal length of the lens. In other words, the f/ number is the calibration on the lens indicating the aperture or iris opening (and therefore, the amount of light transmitted through the lens). the larger the f-stop number, the smaller the aperture, the smaller the f stop number, the larger the aperture.

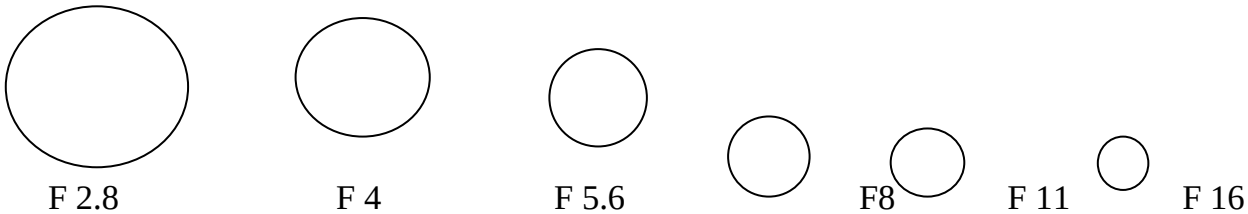

Fig.3.3

3.4 Lighting

There are two sources of light: a) natural and b) artificial- man made. We have no control over the source or natural light. We can however, control its effect through selection and reflection. The adjustment and moulding of light can be carried out to the most critical of standards when using artificial light.

Lighting is most often seen as the means whereby the cameraman can create the correct mood in a scene or illuminate a person or object in such a way as to draw it to the attention of the audience. These are of course important uses of light but a more fundamental use of light on the set is to create space. Too much light destroys space; it is the balance between the light and the dark in the picture that is the source of the illusion.

Three-Point Lighting

This is a basic lighting technique that helps to create an illusion of three-dimensionality by separating the subject from the background using key, fill and back light. The key light is which is usually bright and harsh is the main source of light. It is meant to light the subject onto the background.

Fill light- the fill light is either a frosted bulb or diffusion material approximately half the intensity of the key light and is used to soften shadows on the side of the subject that is affecting.

Back light- it is used to cast a rim of light on the top of the head and shoulders so as to separate the character from the background

Reasons for Lighting

- To illuminate a scene so that imaging is possible
- To bring out proper contrast ratios between the lightest lights and the darkest darks.
- To bring out proper colour shades and intensities

- To model the subject pleasingly.

Lighting Products/Objects

- Tungsten (quartz Halogen/Tungsten Halogen) lights.
- HMI- Hydrargyrum medium-arc iodide lights.
- Fluorescent lights.
- LED Lights- Light emitting diode.
- Barn Doors- Metal flaps used to keep light failing where it is needed.
- French flag- to block light falling in areas not desired.
- Diffusion material/ wire mesh screen – to lower light intensity
- Gel- colored gelatin to change of light.

4.0 CONCLUSION

We have focused our attention on the techniques involved in camera operation, how to use camera shots to persuasively communicate to the viewing audience. We examined the basics of a good picture making and we have discussed camera mounts and movements, directional continuity and the 180 rule also known as crossing the imaginary line of axis.

5.0 SUMMARY

By now, you should be able to describe the visualisation process in terms of shots, camera angles and viewpoints; explain the different camera movements and camera mounts; demonstrate pictorial composition, essential area, rule of thirds, directional continuity using the 180-rule crossing the imaginary line of axis, lens perspective-depth of field, zoom lens, macro lens, telephoto lens etc. You should also be able to explain and discuss the different types of lighting and their effects on a subject**.**

6.0 TUTOR-MARKED ASSIGNMENT

1. In what ways can you use cinematographic fields of view to convey meaning to your audience? Select and shoot a character applying the rule of thirds from an extreme long shot to extreme close up.

2. What do the following camera angles convey to an audience-low angle, high angle, and subjective camera angle?
3. What's the benefit of using camera supports in production?
4. Explain the 180degree rule. How can this rule be broken?
5. Light a stationary two persons (sitting) interview using three-point lighting. Thereafter, turn off the key light, fill light and the back light.
6. Write a report of what you see each time a light is turned off.

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MODULE 4

Unit 1 Introduction to Principles and Practice of Sound Design

Unit 2 Microphones and Their Pick-Up Patterns

Unit 3 Sound Mixers, Consoles and Sound Recording Devices

UNIT 1 INTRODUCTION TO PRINCIPLES AND PRACTICE OF SOUND DESIGN

CONTENTS

1.0 INTRODUCTION

In this unit you will learn about sound and noise in film and video production. You will be taught what video sound and film sound is. You will also learn about the contributions of sound in a visual story and why it is important to produce a visual story with sound. Specifically, you will learn about the information function of sound, the outer orientation function of sound, the inner orientation function of sound, and the structural function of sound.

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- define sound and noise
- differentiate between sound and noise
- describe the nature of sound acoustics and psycho acoustics
- differentiate between film sound and video sound
- list and explain the functions of sound in video/film production.

3.0 MAIN CONTENT

3.1 Sound in Film and Television

Sound in various manifestations (dialogue, music, sound effects, and the like) is an integral part of video and film. Sound represents the all-important dimension in the total field of media aesthetics. For some time, sound in film was considered an additional element to an already highly developed, independent visual structure. A considerable amount of time elapsed before the "talkies" were accepted aesthetically as constituting a medium in their own right. Broadcast television and all other forms of video, on the other hand, were born as audiovisual media. Unfortunately, the various media terms such as *film, motion pictures, cinema, television,* and *video,* do not incorporate the audio concept. This neglect may have caused some people to believe that sound is a less important or nonessential adjunct of the visual fields of video and film. This is not true because sound is indispensable to video and film communication.

Almost from the very beginning, television sound and pictures were picked up, processed, and broadcast simultaneously. Live television obviously did not permit any postproduction doctoring of sound. But even now, when we have sophisticated digital video and audio postproduction facilities available, we generally record sound and pictures of most routine video productions together. The ***sweetening*** of sound, that is improving the quality of the recorded audio mix or more extensive sound postproduction is done only in larger video projects as part of the total postproduction activities.

3.2 What is Sound? What is Noise?

Many scholars have tried to define sound and noise in various ways. However, Zettl's definition of sound and noise looks more appropriate. He defines Both sound and noise as audible vibrations (oscillations) of the air or other material. From the definition of both sound and noise it seems there is no difference between sound and noise. Actually, aesthetically, the distinguishing factor between sound and noise is its communication purpose. ***Sound*** has purpose; it is organised. ***Noise*** is essentially random. However, the same audible vibrations can be sound at one time and noise at another. That is why both sound and noise often go together in movie production.

Sources of Noise

There are basically two types of noise; ambient noise, and system noise.

Ambient noise-comes from open mics fed into an audio console or tape recorder that pick up the sound of air ventilators, lights, cameras, or other devices. (Fluorescent lights frequently cause a hum or buzzing sound, for example.) A second type of noise is called

system noise - which can come from the electrical recording system and equipment. Microphone lines placed too close to lights and electrical cables often create system noise, as do worn volume controls or bad circuit boards and cable connections. Tape hiss is inherent in any system using analog tape recordings. Most ambient noise and some system noise can be controlled, but most system noise is simply inherent in the recording equipment. A digital audio system cannot control ambient noise any differently than an analog system can, but a digital system does reduce system noise to a minimum level. Therefore, signal-to-noise ratios are less important in digital systems. Whether you're recording audio on a soundproof set or outside on location, there are situations to be aware of and situations to prevent since some of these situations could be sources of noise.

Obstructions: Jewelry or clothing can rub or click against a clip-on lav.

Lights: Neon or fluorescent lights that are barely audible to the ear can cause a buzz or hum on the audio.

Appliances: Certain set pieces or existing appliances on location create their own sounds like a refrigerator or an air conditioner.

Motors: Your location might be near a busy street or under an air traffic pattern.

Weather: The rustling of wind, even a faint breeze, can be a detriment in recording clean dialogue.

Neighbors: A school playground, a lumberyard, an auto repair shop, or a house with a lawnmower can create interfering noises.

Construction: Incessant reverberations from jackhammers or saws can travel into a location or a studio, even from a distance.

Batteries: If the battery power on a mic's body pack goes out, you've lost your sound. Plan ahead with an adequate supply of charged batteries.

3.3 Sound Acoustics

The quality of the recorded sound is controlled to some extent by the microphones used to capture them. However, some challenges may arise due to a factor called "acoustics", because Sound waves are impressive and fluid. They can be muffled by surfaces that are soft and spongy such as rugs, furniture, clothing, curtains, and even human bodies. On the other hand, surfaces that are hard and reflective, like glass, tile or vinyl floors, mirrors, and low ceilings, can deflect and bounce sound waves creating echoes or distortion. A location might look just great, but it's got challenging audio problems like loud air conditioners, the buzz of fluorescent lights in the ceiling, ticking clocks, or public address systems. The behavior of sound waves in gases, liquids and solids is called *sound acoustics.* As a producer, you might want to control your location's environment sound acoustics such that unwanted noises are minimised. These problems can be avoided with foresight, thoughtful use of

microphones, and sound mufflers like moving blankets and microphone windscreens.

3.4 Psycho Acoustics

Though we can measure the behavior of sound waves with measuring equipment, how we experience it is a matter of human perception. Therefore, the best approach to Psycho acoustics is to get familiar with the limit of human hearing. Humans have a limit of hearing sound between 20Hz to 20KHz, the upper limit decreasing to about 16KHz with age. Based on our hearing capabilities, amongst other factors, our perception of sound changes. Psycho-acoustics studies how human beings respond to any given sound such as noise, speech and music.

Hearing is not only a purely mechanical phenomenon of wave propagation but it is also a sensory and perceptual event as well. Sound that travel through the air to reach the ear is transformed to neural pulses which then travel to the brain to be perceived. Psycho acoustics allows us to take advantage of the fact that; both the ear and the brain are all involved in a person's listening experience. Hence, the facts known of psycho acoustics is what informs production of sound in some compression techniques such as; MP3, WAV etc. Also, the ear responds to sound in a nonlinear manner, this response to sound is called sound loudness. This nonlinear response to sound by the ear is used to produce noise reduction systems especially in telephone networks by compression before transmission and expanding for playback. Nonlinear response by the ear can also cause sounds that are close in frequency to inter modulate, causing distortions. The study of psycho acoustics enables us to discover the characteristics of sound how the ear perceives changes in the characteristics. There are many of these characteristics which may be subject for another study. However, we must study few of them which are instrument to the way sound functions in film and video.

3.5 Characteristics of Sound

Some characteristics of sound include; sound figure/ground, sound perspective, spatial sound, sound tempo sound rhythm, hi-fidelity sound etc.

- **Figure/Ground Sound -** in sound design, figure/ground means that you choose the important sounds to be the figure while relegating the other sounds to the back- ground. For example, in a location news report, you need to emphasize the reporter's voice over the ambient sounds of the re engines and other rescue equipment.

- **Sound perspective** -means that you match close-up pictures with "close" sounds, and long shots with sounds that seem to come from farther away. Close sounds have more presence than far-away sounds. ***Presence*** is a sound quality that makes you feel as though you are close to the sound source.
- **Sound Rhythm-** is the perceived speed of sound. Example how fast or how slow a sound is played. Some people refer to sound rhythm as beat.
- **Sound Tempo –** the perceived duration of sound in a production. How sound is ordered or arrange to appear in a story space.
- **Spatial Sound –** sound that indicates the location of an event. Spatial sound can indicate a locale or the time of event.
- **Hi-Fidelity** – this is the faithful reproduction characteristics of sound. Hi Fi sound means if someone makes a certain sound it is often reproduced exactly as the person's voice. When you hear the sound of a dog barking you expect to see a dog.

These characteristics provide sound designers with the psycho acoustics of sound. They then use the psycho acoustics to find out how people perceive sound.

3.6 Functions of Sound

The way people perceive sound is very useful in sound design especially in film and video communication. Their perceptions provide an insight into how sound functions. The many functions of sound in film and video production include; information function, outer orientation function, inner orientation function and structural function.

Information Function of Sound

The information function of sound includes:

- Dialogue (information gained in a conversation between two people)
- Narration (information acquired from on or off camera sound).
- Direct Address (information acquired as the performer speaks directly to the viewers).

Outer Orientation Function of Sound

Inner orientation function of sound includes:

- Orientation in Space (when sound tells a location or place)
- Orientation in Time (when sound is used to tell time of day; morning, evening)
- Orientation to Situation (when sound helps predict an outcome).
- Orientation to External Conditions (when sound is used to show the external condition of an object; big/small, smooth/rough, high/low, old/new, fast/slow).

Inner Orientation Function of Sound

Inner orientation function of sound includes those related to:

- Mood (sound used to express state of a person laugh/cry, happy/sad)
- Internal condition (when sound tells viewers whether one is in a stable or unstable environment).
- and Energy (when sound (music) is used to supply energy to visuals).

Structural Function of Sound

The structural function of sound includes:

- Rhythm (sound used to depict how fast or slow object is moving)
- Figure/around (when important sound is louder)
- Sound perspective (when far sound is lower)

Sound continuity (when sound level is continuous after several edits).

4.0 CONCLUSION

We have examined sound and noise in film and video production. We have also examined various functions of sound.

5.0 SUMMARY

Now, you should be able to define sound and noise; clearly differentiate between sound and noise; give a clear description of the nature of sound acoustics and psycho acoustics and differentiate between film sound and video sound. Also, you are expected to be able to list and explain the functions of sound in video/film production.

6.0 TUTOR-MARKED ASSIGNMENT

1. What is the difference between sound and noise?
2. What do we mean by Acoustics and Psycho acoustics?
3. What do we use psycho acoustics for?
4. Explain any five functions of sound used in Film and Video production.

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UNIT 2 MICROPHONES AND THEIR PICK-UP PATTERNS

CONTENTS

1.0 INTRODUCTION

In the previous unit, we discussed about sound and noise. You were taught how important sound is to a production. In this unit, you will learn how to use sound producing equipment to produce sound needed to tell a visual story. You will learn about the various types of microphones and their pick-up patterns. This will enable you to make informed decisions on which microphone types to use in sound productions. Finally, you will learn how to record sound and monitor the recordings.

2,0 OBJECTIVES

By the end of this unit, you will be able to:

- list different types of microphones used in sound production.
- explain various microphone pick up patterns
- state how to select the best microphone types for different location sound recordings.

3.0 MAIN CONTENT

The pick-up of live sound is done through a variety of microphones. How good or bad a particular microphone is, depends on how it is built but especially on how it is used. Choosing the most appropriate microphone and operating it for optimal sound pick up requires that you know about three basic electronic characteristics: i. Sound generating elements, ii. Pick up patterns, iii. Microphone features.

3.1 Sound Generating Elements

All microphones transduce (convert) sound energy to electrical energy which is amplified and reconverted to sound waves by the loudspeaker. The initial conversion is accomplished by the generating elements of the microphone. There are three major types of sound converting systems which are used to classify microphones. These are: dynamic, condense and ribbon.

Dynamic microphones - These are the most rugged. dynamic microphones also called moving coil microphones can tolerate reasonably well the rough handling that film and television microphones frequently receive. They can be placed close to the sound source and still withstand high sound levels without damage to the microphone or excessive input overload/distortions of very high volume sounds. They can also withstand fairly extreme temperature. They are an ideal outdoor microphone.

Condenser microphones - condenser microphones are much more sensitive to physical shock, temperature change and input overloads but they are usually produce higher quality sound when used at greater distances from the sound source. Unlike the dynamic microphones, the condenser microphone needs to be powered by a small battery because it has a built-in pre-amplifier. condenser microphones can also be powered through the appropriate voltage supplied by the audio console mixer through the audio cable. This method of supplying power to the microphone is called “phantom power”.

Ribbon microphones - similar in sensitivity and quality to the condenser microphones, ribbon microphones produce a warmer sound frequently preferred by singers. Unlike condenser microphones, which you may use outdoors, under certain

circumstances, ribbon microphones are strictly for indoor use. They are also called velocity microphones.

3.2 Microphone Pick Up Patterns

Some microphones like our ears hear sounds from all directions equally well, others hear sound better when they come from a specific direction. The territory within which a microphone can hear equally well is called its pick-up pattern; its two-dimensional representation is called the Pollar pattern. There are three basic types of microphone pick up pattern: a. the Uni-directional, b. Omni-directional and c. the Bi-directional.

In film and television production, you need to use both Omni-directional and Unidirectional microphones depending on what and how you want to hear sound from all directions more or less equally well. The Uni-directional microphone hears better in one direction i.e. the front of the microphone than from its sides or back. The Bidirectional microphone hears better both sides sad not from its front or back.

Operational Characteristics of Microphones

Some microphones are designed and used for sound sources that are moving whereas others are used more for stationary sound sources. Therefore, there are mobile and stationary microphones. Of course, any of the mobile microphones can be used in a stationary position and the stationary microphones can be moved about if the production situation requires so.

The mobile microphones include:

- The lavaliere
- Hand
- Boom
- Headset and
- Wireless microphones

The stationary microphones include:

- Stand

- Hanging
- Hidden and
- Long distance microphones.

Lavaliere Microphones- the lavaliere microphone is probably the most frequently used on camera microphone. These microphones are usually very small in nature hence can be fastened to the clothing with a small clip. Because of their size, they are unobtrusive and look more like jewelry than a technical device. They are designed primarily for voice pick up.

Hand Microphones- the hand microphone as the name implies is held by the performer. It is used in all production situations in which it is most practical that the performer exercise some control over the sound pick up. Hand microphones are used extensively in news and documentary productions, where the reporter often walks in the midst of much commotion and noise. For singers, the hand microphone is part of the act. They may switch the microphone from one hand to the other to visually support a transition in the song.

Boom Microphones- when a production such as a dramatic scene requires that you keep the microphone out of camera range, you need a microphone that can pick up sounds over a fairly great distance while making it seem to come from close up and which keeps out most of the unwanted sound surrounding the scene. This is usually suspended from some kind of boom, or is handheld with the arms acting as a boom. This is why this type of microphone is called the boom microphone.

Headset Microphones - consists of a small but good quality, omni- or unidirectional microphone attached to earphones. One of the earphones carries the program sound (whatever sounds the headset mic picks up or is fed from the station), and the other carries the *I.F.B.* (Interruptible Foldback or Feedback) cues and instructions of the director or producer. Headset microphones are used in situations, such as sports reporting or in electronic news gathering.

Wireless (RF) Microphones-As media productions become more mobile, a need for a system of connecting audio sources with recorders and mixers without entangling

wires brought about the development of radio frequency (RF) wireless microphones. Each RF system consists of a microphone, a transmitter, and a receiver. Mics (usually electret) may be body mounted, head mounted, handheld, stand, or boom mounted. Each mic must be connected to a transmitter. A transmitter may be built into the base of the mic or plugged into the base of the mic, or a lavaliere mic may be connected with a short cable to a body-mounted transmitter. The receiver may be a small, battery-operated unit mounted on a camcorder or a larger A/C-powered unit feeding a mixer, public address system, or recorder.

4.0 CONCLUSION

Good sound equipment is very important to the production of sound needed to tell a visual story. Various types of microphones with different pick-up patterns are a part of the equipment.

5.0 SUMMARY

Having gone through this unit, you should be in a position to list different types of microphones used in sound production. Again, you should be able to explain various microphone pick up patterns, select the best microphone types for different location sound recordings and perform exercises in sound recording.

6.0 TUTOR-MARKED ASSIGNMENT

1. List and explain at least ten types of microphones.
2. What are microphone pick up patterns?
3. Record at least five munities of a dialogue and analysed the output.

7.0 REFERENCES/FURTHER READING

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UNIT 3 SOUND MIXERS, CONSOLES AND SOUND RECORDING DEVICES

CONTENTS

1.0 INTRODUCTION

In the previous unit, you learnt about sound pick up patterns, the types of microphones and their uses. In this unit, you will explore the equipment and the techniques of controlling sound and sound recordings in film and video studio and field productions. Also, you will learn about sound controls and recordings, identify the major equipment and production techniques for mixing and recording sound in the studio and the field.

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- identify and explain sound recording equipment
- explain the techniques in studio and field sound recording
- perform basic sound recordings and sound mixing.

3.0 MAIN CONTENT

3.1 The Sound Mixer

A sound mixer normally serves in *mixing* (combining) two or more audio signals. Most portable mixers have only three or four input channels and one or two outputs. Even then the small mixers require that you distinguish between low-level and high-level input sources. A switch above or below each sound input must be set either to *mic*for low-level inputs, such as all microphones, or to *line* for high-level sources, such as the output of a CD player. Because most of the time you will use the field mixer for mixing microphones, double-check that the input switch is set to *mic.*

If you are not sure whether a particular piece of audio equipment produces a mic-level or a line-level signal, do a brief test recording. Don't rely on the VU meter when playing back the test recording—you should actually listen to it with headphones. The VU meter might show the recording to be in the acceptable volume range, but it will not reflect sound distortions.

Even though some digital mixers have more inputs as well as some quality controls, elaborate mixing in the field is not recommended unless you're doing a live telecast.

3.2 The Audio Console

Regardless of their individual designs, audio consoles are meant to perform at least five specific tasks as follows:

- **Input***:* to pre- amplify and control the volume
- **Mix:**to combine and balance two or more incoming signals.
- **Quality control:**to manipulate the sound characteristics
- **Output:**to route the combined signals to a specific output
- **Monitor:**to listen to the sounds before or as their signals are actually recorded or broadcast

Input - Studio consoles have multiple inputs to accept a variety of sound sources. Even small studio consoles may have sixteen or more inputs. Although that many

inputs are rarely used in the average in-house production or broadcast day, they must nevertheless be available for the program you may have to do the next day.

Mix - The audio console lets you combine, or *mix*, the signals from various inputs, such as two lavaliere mics, the background music, and the sound effect of a phone ring. The *mix bus* combines these various audio signals with the specific volume that you assign. Without the mixing capability of the board, you could control only one input at a time. The completed mix is then fed to the line-out.

Quality control - All audio consoles have various controls that let you shape the character of a sound. Among the most important are equalization, filters, and reverberation (reverb) controls.

Monitor- All consoles have a monitor system, which lets you hear the final sound mix or allows you to listen to and adjust the mix before switching it to the line- out. A separate audition or cue return system lets you hear a particular sound source without routing it to the mix bus.

Output- The mixed and quality-processed signal is then routed to the output, called the *line-out.* To ensure that the mixed signals stay within the acceptable volume limits, they are regulated by final volume controls—the master pots—and metered by volume indicators, the most common of which is the ***volume unit*** *(VU)* ***meter.*** *As* the volume varies, the needle of the VU meter oscillates back and forth along a calibrated scale,

3.3 Sound Recording Systems

The sound of routine Video productions is usually recorded simultaneously with the pictures on one of the audio tracks of the videotape recorder. There are occasions, however, when you need to back up your sound recording with a separate audio recording, or record the audio on a separate system for high-end postproduction. Even if you don't intend to become an audio expert, you need to know what systems are available to you.

In general, audio-recording systems can record audio signals in analog or digital form.

A*nalog* means that the signal fluctuates exactly like the original stimulus; *digital* means that the signal is translated into many discrete digits (on/off pulses). Almost all audio recording in professional television is done digitally. As with video, digital audio recordings excel not only in sound quality but also in maintaining that quality in extensive postproduction editing. Because digital systems allow you to see a visual display of the recorded sounds, they make editing much more precise than with the analog methods. But don't dismiss analog audio just yet. Many older camcorders and VHS recorders are still analog, and there are extensive analog sound archives that will most likely remain analog even in the digital age. You may still have a collection of analog equipment that most likely includes an analog cassette machine. Some audio purists have returned to analog sound systems because, according to them, analog recordings have a warmer sound than digital ones.

Analog Recording Systems

All analog recording systems are tape-based. Here we briefly touch on the two analog audio systems that are still in use: the open-reel audiotape recorder and the audio cassette recorder. The operational features of analog ATRs have been inherited by the digital recorders.

Digital Recording Systems

High-capacity, rugged hard drives coupled with efficient compression systems such as *MP3* make disk-based systems the prime audio-recording medium in television production. The more popular systems include: (1) the digital cart system, (2) mini disks and flash memory devices, (3) hard drives with removable or fixed disks, and (4) optical disc systems with a variety of CD and DVD formats.

4.0 CONCLUSION

In this unit, we have explored the equipment and the techniques of controlling sound and sound recordings in film and video studio and field productions. We have also examined sound controls and recordings.

5.0 SUMMARY

You by now**,** you should be able to identify and explain sound recording equipment, explain the techniques in studio and field sound recording and even perform basic sound recordings and sound mixing.

6.0 TUTOR-MARKED ASSIGNMENT

1. Differentiate between audio console and audio mixer.
2. Differentiate between digital and analog audio recording devices.
3. What functions do audio mixers perform?

7.0 REFERENCES/FURTHER READING

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MODULE 5

Unit 1 Introduction to Film & Video Editing
Unit 2 Film & Video Editing Systems and Technology
Unit 3 Editing Applications

UNIT 1 INTRODUCTION TO FILM AND VIDEO EDITING

CONTENTS

1.0 INTRODUCTION

This unit is about editing- how editing is defined and how it was introduced into film and video production. It shows how the various types of editing were done in the past. From film screenings and practicals, you will explore picture and sound editing and use short edited movie scenes to illustrate and facilitate the learning process. You will be taught how to analyse cinematic elements such as mood, rhythm, continuity, story structure etc.

2.0 OBJECTIVES

By the end of this unit , you will be able to:

- explain the evolution of film and video editing
- state reasons why editing is necessary after production (shooting)
- name and explain the basic types of shots and edit transitions
- name and describe video editing production workflow
- explain the role of a film editor in post-production
- differentiate the tools used in both film (celluloid) and video editing.

3.0 MAIN CONTENT

3.1 A Brief History of Film/Video Editing

The word editing is used as a synonym for cutting. Editing is the decision taken regarding alterations needed in respect of a film production, in order to achieve the desired result. Editing is combined with the manual operation of cutting to produce the sample print.

The early movies were recordings of real life events. Films such as *Workers Leaving the Lumiere Factory* (1895), *The Arrival of Train* (1896) were actualities shot in one single take and were not edited before showing it to viewers. Georges Melies*A trip to the Moon* (1902) Edwin Porter's *Life of an American Fireman* (1903) and *The Great Train Robbery* (1903) by David Wark Griffith are accredited with not just pioneering film editing but for adding innovations and creativity in the art of film editing.

3.2 Editing Tools

- The basic editing tools at that period were a pair of scissors to splice the footage
- Tape to join the film strips in the correct story order

The Moviola Machine: The invention of the moviola was significant to the evolution of film editing for the following reasons:

- Enabled the editor to see the film and determine where it would be best to cut the film
- Helped to make crisper and better edits

Steenbeck Editing Machine: With the invention of the Steenbeck editing, it was possible to cut 16mm and 35mm films. The KEM Universal editing system was later introduced. The following accessories complemented the editing process: Moviescope, Moviola synchroniser for film and sound, cement splicers for joining the films strips together. The Moviola and Steenbeck Machines advanced film editing for almost 50 years until the emergence of the video tape technology in the 1950^{s}.

3.3 Your Role as a Film Editor

Let's revisit the editing basics by asking the question;

What is editing? Thompson and Bowen have this to say:

"Editing for motion pictures is the process of organising, reviewing selecting and assembling the picture and sound "footage" captured during production. The result should be a coherent and meaningful story or visual presentation that comes as close as possible to achieving the goals behind the original intent of the work to entertain, to inform, to inspire etc." (1)

As we have mentioned earlier in the history of film editing, your job as an editor is not just to cut out excess footage but to arrange the shots in such a way that they will evoke emotional response from the viewers. Note that every film or programme you see on television be it drama, commercial advert, news report, talks show or children's programme has been edited, cut down, re-recorded, padded out, massaged, sweetened and tweaked before the final version of the work is presented to the viewing public. You as the editor are the last creature personnel to perfect on any film work. Films are not shot in the order the script was written, they are shot out of sequence. It is your responsibility as an editor to put all these pieces together in a creative manner so as to impact on the audience.

With the advanced technology in computer editing systems today, you will notice how films shot on celluloid film employ the post production technology of the computer to obtain virtual images that are professionally superb, solid and engaging with the audience. As a film editor, you are expected to assess, and assemble all the film

footage by utilising your creative skills by visualising the best way to turn the director and the script writer's vision into a visual reality.

3.4 Types of Shots

You are aware that you choose different words and put them together logically when making sentences during a conversation. In like manner, the visual language of film is contained in the different types of shots the director considers most suitable to tell a story. The director's ability to select and control visual images begins with his understanding of specific types of shots. This is a visualisation process that heavily depends on shots compositions, camera to subject distance, camera angles, physical movement or optical movement of the camera lens etc.

- Extreme close-up (XCU or ECU)
- Big close-up (BCU)
- Close-up (CU)
- Medium close-up (MCU)
- Medium shot (MS)
- Medium long shot (MLS)
- Long shot (LS) or wide shot (WS)
- Very long shot (VLS, XLS)
- Two shot (2S)
- Over the shoulder (OTS).

3.5 Camera Angles/View Points

The camera angle otherwise known as view point is the angle subtended at the lens by the main subject in the picture area. Alternatively, it is the relative position of the camera when compared with an eye-level view at a normal distance. In this latter context, the view point is said to be high, low, near or distant. The choice for a particular camera angle may be to enhance identification with the character's psychological, or philosophical point of view.

- Point of View (POV) a shot as seen from a specific character's perspective.

- Over the shoulders (OS) Camera looks over a character's shoulder (shoulder and back of head included in the shot) at another person
- Objective shot - the camera is placed outside the scene as it records. The performers do not look at the camera. It is regarded as the viewer's point of view. Most motion picture films are shot using the objective camera angle.
- Subjective angle - places the viewer on the screen with the performer. It brings person – to - person eye contact.

A film is not necessarily shot in the way the story is written on the script. Shooting is done out of sequence which means that the film director my start shooting the end of the story first and jump to any part of the story on the script that suits his production schedule. Also during production there could be technical hitches, poor sound, acting, noise, camera movement etc. which may require several takes until there is perfection- the way the director wants the shots to be. The editor's role therefore, is to trim the shots, remove the bad takes, join the film together in a coherent creative way to affect his audience.

3.6 Stages of the Editing Process

It is a known fact today that all efficient editing workflow depend on a solid editing system. There is an array of systems to choose from. These include –Final Cut Pro, Adobe Premier, Microsoft Surface Studio, Corsair One Pro, Imac Pro, Apple Mac Pro, Lenovo Yoga and several others. Irrespective of which ever hard/software you intend to use for editing, your knowledge of the machine/working tool is very essential. The stages of the editing process generally referred to as post production is the standard approach for every film editor. This is the stage where the film editor exercises his creativity by editing the picture and the sound tracks together, special/visual effects are generated, titles, graphics, credits are added, together with sound effects and music during post production to tell a complete story as envisioned by the director who has visually interpreted the script.

To perform an editing process, editors must go through the stages outlined below:

- Acquire – Get all footage shot by the production team whether on emulsion film, analog tape, digital tape or digital files; import, capture or digitize all materials as media on your storage drives.
- Organise – Arrange/sort out all picture and audio materials- label group and sort out all materials needed for the project.
- Review and select – watch all the materials: visual/audio and pick out all the best elements you would require for the edit.
- Assemble Edit together in a logical sequence both picture and sound from the selected material into a skeleton framework of the entire story.
- Rough cut- Tweak the assemble edit until the story flow is cleaner. This is where you remove the fat; trimmed away and the story begins to take shape. It is the tentative arrangement of shots and shot sequences in the appropriate sequence and length. The various picture and sound take in their correct sequence.
- Fine cut – the edited pictures has a tight pacing with no glitches in the picture or sound. The final tweaks are made. No major renovations are necessary in the edited work as a selected group has previewed and given a pass mark.
- Picture Lock- at this stage, all the visual edited elements are rock solid and no further changes are required. You may now begin your audio mixing needs all audio creation and tweaking may begin.
- Mastering and delivery- your work is now completed the finished edited work is authored and delivered to the viewing audience.

Today's technology has made it possible for you to record your final cut video-tape, creating an optional film print for projection in a movie theatre, DVD or as a computer video file.

Basic Shot Transitions

The most common types of transitions from shot-shot that you will use at those edit points you have determined are:

- Cut – the cut is an instantaneous change of one shot to another

- Dissolve – An editorial device that permits the second shot to emerge through the first and replace it on the screen
- Fade in- The gradual appearance of picture from black. Fade out- the disappearance of picture to a black screen.
- Wipe - Transition in which a second image, framed in some geometrical shape gradually replaces all or part of the first one.

4.0 CONCLUSION

Technology has brought about new and easier techniques of editing.

5.0 SUMMARY

Having gone through this unit , you should be able to explain the evolution of film and video editing; state reasons why editing is necessary after production and explain the basic types of shots and edit transitions. Again, you should be able to describe video editing production workflow; explain the role of a film editor in post-production and differentiate the tools used in both film (celluloid) and video editing.

6.0 TUTOR-MARKED ASSIGNMENT

1. Watch the rushes or dailies of a production and give reasons why editing is necessary in shaping the story.
2. What are edit transitions and how do they advance story telling while editing a drama, TV commercial or jingle?
3. What do you understand by the basic post-production workflow? Explain all the stages involved as you progress in editing a short film.

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UNIT 2 FILM/VIDEO EDITING SYSTEMS AND TECHNOLOGY

CONTENTS

1.0 INTRODUCTION

The previous unit showed what film and video editing is. It also examined the role of an editor . You were introduced to shot types and uses in storytelling. In this unit, you will learn about the types of editing which are basically, linear editing and nonlinear editing. You will learn what the two terms mean in editing. Also, you will briefly learn about the technology that is used in both linear and nonlinear editing. And of course, the unit will make a comparison between the two types of editing. Finally, you will learn how to put shots together using both linear editing and nonlinear editing systems.

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- list and explain the types of editing in film and video production
- differentiate between linear editing and nonlinear editing
- describe processes in both linear and nonlinear editing systems
- explain why you would prefer one over the other.

3.0 MAIN CONTENT

3.1 Types of Editing Systems

There are two types of editing systems used by editors. These are- linear and nonlinear editing systems.

a. Linear Editing System

This is usually used to describe video tape editing. It is a video editing post production process that highlights the straight-line principle of editing on tape where typically an editor will start with shot one of a sequence and then add shot two, then shot three and so on until the programme is complete. The process is real time. The Linear, cuts only editing system consists of a source playback VTR, a record VTR, a record monitor, an edit controller, a title generator, cassette and CD players and an audio mixer. The Linear editing uses tape based editing systems hence editing with linear systems is consecutive i.e., you have to roll through all the preceding shots is a linear—one-after-the-other—process. To locate shot 25 on a videotape, you need to roll through the previous twenty-four shots before reaching shot 25. You cannot simply jump to shot 25, skipping all preceding shots. All tape-based editing systems are therefore called *linear,* regardless of whether the tapes contain analog or digital signals. (See diagram).

b. Nonlinear Editing System

In the non-linear editing, you transfer all the video tapes to a computer disc and then edit the video and audio portions pretty much as you would with a word processing program. With non-linear editing, all audio and video information are stored in large capacity hard drivers. You manipulate pictures and sound with the computer much like words and paragraphs during word processing. The non-linear editing station consists of a series of monitors for viewing and hearing the material being edited and a computer to store and manipulate the footage.

In nonlinear editing, the footage is not actually cut and spliced, but is stored in the computer's memory in the order determined by the editor, changes may be made quickly, easily and many times over without damaging the original footage. Once the final edits are satisfactory the final production can be fed out to either film or video tape for distribution.

When information is stored on a disk-based editing system, you can jump to shot 25

directly without rolling through the preceding twenty-four shots. Being able to access any specific shot or frame in random order is a nonlinear process. All disk-based systems are, therefore, called *nonlinear*. Because they are computer-driven, they can operate only with digital signals. In effect, the nonlinear editing system operates like a large ESS (electronic still store) system that allows you to identify and access each frame or frame sequence in a fraction of a second. Because the system is nonlinear, it can display any two or more frames side-by- side on a single computer screen so you can see how well the shots will edit together. (see diagram).

3.2 Film and Video Editing Technology

There are various technologies used in video editing; some are linear and others are nonlinear. To identify the technology used in any type of editing, one simply needs to identify the medium upon which the material is recorded or stored on. Although the terms *linear* and *nonlinear* apply more to the way the recorded information is retrieved rather than stored, you may also hear tape-based systems described as linear recording devices, and disk-based systems as nonlinear ones.

a. Linear Editing Technology

If you are working on a system that is taped based, you are most likely to be working on a linear technology because, all *tape-based video recorders are* linear, regardless of whether the signals recorded are analog or digital. Linear systems record their information serially, which means that during retrieval you need to roll through shots 1 and 2 before reaching shot 3. Even if a tape-based system records the information digitally rather than in analog, it is linear and does not allow random access. You can't call up shot 3 without first rolling through shots 1 and 2. In 1956, Ampex Corp unveiled the first 2-inch broadcast video tape recorder (VTR). Like film, the only practical method to editing video tape involved physically slicing and splicing the tape with a splicing block. The Ampex team led by Charles Anderson carried out improvement on the video tape recorder which gave birth to electronic video editing with several advantages such as:

- The edits were performed electronically unlike the manual splicing of the tape

- Damage due to physical handling of the tape was reduced
- Since the electronic editing eliminated the need to cut the tape, the original master tape was preserved.

Even though the editing process was done electronically was the Ampex Machine, it was still linear in nature.

b. Nonlinear Editing Technology

If you are working on a system that is disc based, you are most likely to be working on a linear technology because, all *disk-based video recorders* (including optical discs and flash memory devices) are nonlinear, which means that you can randomly access any shot without having to roll through the previous material. For example, you can access shot 3 directly by simply calling up the shot 3 file. Of course, you can also watch the recording in linear fashion, starting with shot 1 and then watching shot 2, shot 3, and so on. Random access is especially important when editing because it lets you call up instantaneously any video frame or audio file regardless of where it may be buried on the disk. (The difference between linear and nonlinear system).

The joint venture between CBS and Memorex Corp produced the first computerised offline video editing system known as CMX 600. Today, many companies are producing several generations of newer, more sophisticated computer editing systems with high technology software to support their editing operations. No wonder then that today one experiences the crossover from the traditional film editing to the more user friendly computer based editing which is more economical on time and delivery as well as the immediacy involved in meeting deadlines.

4.0 CONCLUSION

Editing types are basically linear editing and nonlinear editing. We can put shots together using both linear editing and nonlinear editing systems.

5.0 SUMMARY

By now, you should be in a position to list and explain the types of editing in film and video production;differentiate between linear editing and nonlinear editing and describe processes in both linear and nonlinear editing systems.

6.0 TUTOR-MARKED ASSIGNMENT

1. List all disc based systems in your studio
2. Explain the best way to identify a linear based editing system and a nonlinear based editing system.

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UNIT 3 EDITING APPLICATIONS

CONTENTS

1.0 INTRODUCTION

The previous unit taught linear and non-linear editing systems and their technologies. Hence you can differentiate one from the other. With nonlinear editing, came editing applications. In this unit, you will learn about editing applications; what they are, how they evolved overtime and how they can be used for film and video productions.

2.0 OBJECTIVES

By the end of this unit, you will be able to:

- define editing applications
- describe the development of editing applications and list the factors that necessitated the development of editing applications
- explain the common features of editing applications and distinguish how each editing application uses these features
- analyse at least three editing applications and decide on the one that suites your desires.

3.0 MAIN CONTENT

3.1 Definition, History and Development of Editing Applications

Over the years, the original systems for editing were slow, cumbersome, and had problems with the limited technology of the time, but by the mid-to-late-1980s, Computer processing power advanced sufficiently such that by the end of the '80s, it was enough to enable true digital imagery, and has progressed today to provide this capability in personal desktop computers. An example of computing power progressing to make non-linear editing possible was demonstrated in the first all-digital non-linear editing system, the "Harry" effects compositing system manufactured by Quantel in 1985. Although it was more of a video effects system, it had some non-linear editing capabilities. Most importantly, it could record (and apply effects to) 80 seconds (due to hard disk space limitations) of broadcast-quality uncompressed digital video encoded in 8-bit CCIR 601 format on its built-in hard disk array.

Applications software can therefore be defined as written programs, procedures or rules and associated documentation pertaining to the operation of a computer system stored in a computer's read/write memory. Editing applications are the software that are stored in a computer's read/write memory to assist the computer to perform the operation of film and video editing. This operation includes; capturing visual and aural files, storing, organising, modifying and condensing them with an intention of producing a correct, consistent, accurate and complete work and output it for broadcast or archival purposes. An editing application is therefore computer based. It must be stored in a computer based system that has read and write memory capabilities. Editing applications serve as interface between an editor and the computer since it transfers human language to machine language and vice versa.

The use of an editing application was first demonstrated by Editing Machines Corp. in 1989. The machine had an EMC2 editor, a PC-based non-linear off-line editing system that utilised magneto-optical disks for storage and playback of video, using half-screen-resolution video at 15 frames per second. A couple of weeks later that same year, Avid introduced the Avid/1, the first in the line of their Media Composer

systems. It was based on the Apple Macintosh computer platform (Macintosh II systems were used) with special hardware and software developed and installed by Avid. The video quality of the Avid/1 (and later Media Composer systems from the late 1980s) was somewhat low (about VHS quality), due to the use of a very early version of a Motion JPEG (M-JPEG) codec.

Next in line of editing applications was the NewTek Video Toaster Flyer for the Amiga which included non-linear editing capabilities in addition to processing live video signals. The Flyer portion of the Video Toaster/Flyer combination was a complete computer of its own, having its own microprocessor and embedded software. It's hardware included three embedded SCSI controllers. Two of these SCSI buses were used to store video data, and the third to store audio. The Flyer used a proprietary Wavelet compression algorithm known as VTASC, which was well regarded at the time for offering better visual quality than comparable Motion JPEG based non-linear editing systems.

Inspired by the success of Media 100, members of the Premiere development team left Adobe to start a project called "Keygrip" for Macromedia. Difficulty raising support and money for development led the team to take their non-linear editor to the NAB conference. After various companies made offers, Keygrip was purchased by Apple as Steve Jobs wanted a product to compete with Adobe Premiere in the desktop video market. Apple released Final Cut Pro in 1999, and despite not being taken seriously at first by professionals, it has evolved into a serious competitor to entry level's Avid's systems.

Another leap came in the late 1990s with the launch of DV-based video formats for consumer and professional use. With DV came IEEE 1394 (FireWire/iLink), a simple and inexpensive way of getting video into and out of computers. Users no longer had to convert video from analog to digital—it was recorded as digital to start with—and FireWire offered a straightforward way to transfer video data without additional hardware or compression. With this innovation, editing became a more realistic

proposition for standard computers with software-only packages. It enabled real desktop editing producing high-quality results at a fraction of the cost of other systems.

In 1992, a group of industry experts led by Rick Eye a Digital Video R&D team at the Disney Channel had integrated a long-form system that let the Avid Media Composer Apple Macintosh access over seven terabytes of digital video data. With instant access to the shot footage of an entire movie, long form non-linear editing (Motion Picture Editing) was now possible. The system made its debut at the NAB conference in 1993, in the booths of the three primary sub-system manufacturers, Avid, Silicon Graphics and Sony.

Within a year, thousands of these systems, using Avid's Film Composer software (which handled the complex conversions between the offline video frame rates and the 24 fps of film), or the ever more sophisticated Media Composer, had replaced a century of 35mm film editing equipment in major motion picture studios and TV stations worldwide.

In the early 1990s, a small American company called Data Translation took what it knew about coding and decoding pictures for the US military and large corporate clients and spent $12 million developing a desktop editor based on its proprietary compression algorithms and off-the-shelf parts. Their aim was to 'democratize' the desktop and take some of Avid's market. In August 1993, Media 100 entered the market, providing would-be editors with a low-cost, high-quality platform.

Since 2000, many personal computers include basic non-linear video editing software free of charge. This is the case of Apple iMovie for the Macintosh platform, various open source programs like Kdenlive, Cinelerra-GG Infinity and PiTiVi for the Linux platform, and Windows Movie Maker for the Windows platform. This phenomenon has brought low-cost non-linear editing to consumers.

In early 2000, the introduction of highly compressed HD formats such as HDV has continued this trend, making it possible to edit HD material on a standard computer running a software-only editing application. The increasing availability of broadband internet combined with the use of lower resolution copies of original material (video proxies) provided an opportunity to not just review and edit material remotely but also (since it is a public network) open up access to far more people to the same content at the same time.

In 2004, the first cloud-based video editor, known as Blackbird and based on technology invented by Stephen Streater, was demonstrated at IBC and recognized by the RTS the following year. Since this time, a number of other cloud-based editors have become available including systems from Avid, WeVideo and Grabyo. Despite their reliance on a network connection, the need to ingest material before editing can take place and the use of 'video proxies', their adoption has grown.

As of 2014, 4K Video in NLE is fairly new, but it is being used in the creation of many movies throughout the world, due to the increased use of advanced 4K cameras such as the Red Camera. Examples of software for this task are Avid Media Composer, Apple's Final Cut Pro X, Sony Vegas, Adobe Premiere, DaVinci Resolve, Edius, and Cinelerra-GG Infinity for Linux. As of 2019 8K video is relatively new and 8K video editing requires advanced hardware and software capable of handling 8K video.

3.2 Challenging Issues with Editing Applications

From the history of the evolution of editing applications, several challenges can be seen to be instrumental to the evolution of editing applications of old. Some of the challenging issues included:

- **Need for Integration:** Integration here means, if there is a part of the tool you feel isn't as good as you need it to be in an editing application, is there a possibility a plugin exists out there to help you make it better? These therefore saw the need for applications to integrate more plugins to improve editing

capabilities. The improvements meant one could get plugins that help create 3D visual effects, remap time to create slow-motion scenes, stabilise your videos and improve the color options.

- **Importing, Rendering and Exporting**: When editing applications were introduced, some of the challenges were storage efficiency and capabilities. Changes in the capabilities of the applications meant that You can view your snippets and files before you upload them. Allowing you to avoid bulk importing entire files, in the hopes that you can dig out the right one. Exporting and rendering in seamless fashion. Whether this happens in real-time or not so that there is no waiting around for the file to export, save to your computer, and then waiting again for it to upload.
- **Collaboration:** the need to share files and edit across a network is also another issue that necessitated the desire to develop better editing applications. Meaning that no matter where your team is, you can always get access to the same files without exporting them to a third-party tool. Editing applications needed to achieve this collaboration to enable different applications to work together for better performance.
- **Optimisation:** to provide better working environment and better user interface, editing applications had to continue to develop platforms that provide overall optimisation of the work environment. For example, providing the ability to add a custom column in a bin with the ability to place that custom column in any position you'd like or change the color of your timeline or project, plus select the font of your choice.
- **Ease of use:** For ease of use of editing application, developers designed applications which offered features which aided how easy it was to edit. For example, ScriptSync was introduced by Avid to analyse all the clip dialog that is in your project then sync the relevant clips that it finds to your script, allowing the user to find the best takes with greater speed. Also, PhraseFind will index all the project clips dialogue, which makes it easier to find a relevant clip by searching for a specific keyword or phrase.

Film producers all over the world rely on; quality of production, speed of production, ease production and efficiency of storage. Hence, editing applications will continue to evolve to take care of these demands. Therefore, we expect to have more collaborations, more integrations in the workflow, more overall optimisations and more import, rendering and exporting possibilities in the editing applications of the future.

3.3 Common Features of Editing Applications

In defining editing applications three words clearly stand out. These are; capture, edit and output. This means all editing applications must have capacity to capture, edit and output edited footage into formats of a client's choice. These features and characteristics of editing applications can be put to use differently by different editing applications.

- **Capture:** To effectively capture or input footage to the computer hardware/software, digitisers which are capable of compressing the raw footage recorded by the camera into a format that will be easy for the computer storage devices to accommodate. The digitizers of course perform differently from one editing application to the other. The formats produced by digitizing & compressing ranges from video formats such as m-JPEG, MPEG, H. 264, 4K etc. the underlying preference for any digitizers is in the quality of video, speed of transferring footage and of course the efficiency of storage.
- **Edit:** Another of the features every editing application must have is the capacity to edit. This capacity for editing means the ability of the application to; arrange, cut video, colour correct, add effect and of course mix audio and video together in an orderly and logical sequence. For editing applications to do these, they must have what is referred to as a timeline a graphical user interface between the computer and the operator. The timeline is made up of tracks unto which video and audio clips are arranged in a sequence. Editing therefore starts and ends at the timeline. Very vital to how an editing application does its functions.

- **Output:** Edited footage is expected to leave the computer storage devices one way or the other and the speed at which they leave is also important. As a result, an editing application must provide the editor with this opportunity/capability. They must provide the capability to reverse as it were the quality of output similar to the quality of capture or input. Its hardware/software must be capable of encoding edited footages to different file formats as demanded by the clients. These footages can be broadest directly to TV, published to the web, comprised on DVDs or send to mobile devices etc. the areas these videos are sent require different file formats that is based on storage capacity, speed of transfer and the quality of encoding which could be anything from MPEG, JPEG, WAV, AVI H. 264 4k, 8k etc.

3.4 Analysis of Popular Editing Applications

Editing applications though, with almost the same features, do have different ways by which the features are applied in performing editing functions. Here we try to compare the ways these features are used by three different editing applications; Final Cut Pro, Avid Media Composer and Adobe Premiere Pro.

Table 3.1: Analysis of Three Editing Applications

DECISION FACTORS	FINAL CUT PRO	AVID MEDIA COMPOSER	ADOBE PREMIERE
1.Ease of Use	Final Cut Pro has by far the most intuitive user interface; it's put together in a way that makes sense to a first-time user. Editing options are placed in logical progressions for an editing workflow, and finding your way around the tool just feels natural.	Avid Media Composer offers a feature which they call ScriptSync. This technology analyses all the clip dialog that is in your project. Then it syncs the relevant clips that it finds to your script, allowing the user to find the best takes with greater speed. Also, PhraseFind will	Adobe Premiere isn't quite as intuitive in comparison and is targeted to more experienced video editors. But, that doesn't mean it's bad. They've sacrificed some user experience to create a more logical structure for their users. Files are easier to find, layers are clearly separated and once you get the

		index all the project clips dialogue, which makes it easier to find a relevant clip by searching for a specific keyword or phrase.	hang of the menus everything is easy to find.
2.Color Options	The color options in Final Cut Pro is not very good but it can be improved by using external plugins like Color Finale. If you're working on simple videos, like interviews or marketing videos, not having this won't give you too much trouble.	is now supported, the responsiveness with the Avid Artist Color Controller has been improved and the ability to export a simplified AAF file has been added.	Adobe Premiere comes with the best color grading options on the market. With such a wide and varied palette of options, you can: bring your raw videos files to life, use colors to elicit emotions in specific scenes.
3.Overall Optimization	Final Cut Pro is the fastest video editing tool in the world right now. Think of it as a tailored suit for your Mac device. The inner workings of this tool have been created to interact perfectly within the limits of your computer. Because of this, it's able to offer low rendering and exporting times for videos, even at a 4k quality, without using up too much power. Making it the perfect choice for situations where you	With Avid, there are new ways to customize your work area for more viewable workflow and organisation. To add a custom column in a bin with the ability to place that custom column in any position you'd like. Change the color of your timeline or project, plus select the font of your choice. Because of the added number of audio tracks, you might need to simplify the tracks you're viewing in your mixer to show	Adobe Premiere, on the other hand, is much slower. Without being tailor-made for a computer, it has to use what's available on each device. This makes exporting and rendering times much slower and means it'll drain your battery quicker than you can drain your bath.

	can't connect to mains power, like on a plane.	only the tracks you want.	
4.Timeline and Tracks	Final Cut Pro has a Magnetic Timeline. This timeline works like a storyline. It allows you to seamlessly connect scenes or sections of video, and automatically removes anything on your timeline that may interfere with that. This also prevents you from accidentally overwriting any existing footage by moving a clip around. You can also take advantage of a great tool called connected clips. This allows you to cycle in different pieces of footage, like three different takes of the same scene, to see how it fits into your content.	The timeline has seen some improvement. You can now add both audio and video tracks by just moving video into an empty space in the timeline, much like other editors. A new Quick Find and Filter field is now available in the effects palette for simplifying the search for a given effect. Lastly, the maximum audio tracks have been increased almost threefold from 24 to 64. Media Composer was a great editor to learn on because it forced the user to know what media they were using and required them to tell the program, not the other way around. Sure it was rigid, but it forced a better understanding of codecs, resolution and containers.	Adobe Premiere's has a more traditional and flexible timeline. Working on different layers of video, audio, image, and text, you're able to precisely work on individual elements. This gives you a higher level of flexibility, control and, customisation for your video that you don't get in Apple's tool. You can work on your layer of the project, and your sound editor can swoop in and work magic on her level, too. As I mentioned before, it can be a little less intuitive, and a slip of the mouse can often mean disaster for your work. But once you get the hang of it you'll love the amount of freedom you have. Especially on bigger projects with lots of moving parts.
5.Collaboration	In the newest updates, Final Cut Pro does allow for collaboration with outside parties. But, unlike the rest of the tool, it's time	With 7.0, version, Avid added background transcoding services and FrameFlex – Avid's solution for bigger-than-HD files.	Through the Adobe Teams Project, you're able to share files and edit across a network. Meaning that no matter where your team is, you can always get

	intensive and not straightforward. Plus you'll hit snags the minute you have to work with anyone who isn't using a Mac.	FrameFlex enables resizing and pan/scan/zoom control within that file's native resolution. Media Composer also accepts mixed frame rates within a single timeline, by applying Motion Adapters to any clip that doesn't match the frame rate of the project.	access to the same files without exporting them to a third-party tool.
6. Integrations	Final Cut Pro can easily be enhanced with plugins. If there is a part of the tool you feel isn't as good as you need it to be, there is probably a plugin out there to help you make it better. You can get plugins that help you: create 3D visual effects, remap time to create slow-motion scenes, stabilise your videos and improve the color options.	Thanks to Avid's installation and activation process, Media Composer is the most transportable of the three. Simply carry Mac and Windows installers on a USB key along with your activation codes. It's as simple as installing the software and activating the license, as long as any other installations have been de-activated prior to that.	Adobe Premiere, requires your video to be exported to for instance, Adobe After Effects first. This can make for a lengthy and time-intensive process. This is because Adobe Premiere comes as part of Adobe's Creative Cloud, which is a Marvel's Avengers-esque suite of tools to support your video making.
7.Importing, Exporting and Rendering	You can view your snippets and files before you upload them. Allowing you to avoid bulk importing entire files, in the hopes	For now, Avid Media Composer is still limited to HD (1920 x 1080 maximum) sequences and output sizes.	Adobe tool offers the widest range of export presets, ranging from small iPhone screens, all the way up to cinema projectors. If you know your

	that you can dig out the right one. Exporting and rendering in Final Cut Pro is seamless. Once you begin your export to a specific place, it happens in real-time. You can also export high-quality videos, as high as 4K quality.	DNxHD for Media Composer.	audience, and where they'll be consuming your content, you can optimise your videos like never before.
8. Pricing	Final Cut Pro retails at an affordable one-time payment of $299. For this you get the complete pro package, which can be upgraded with further plugins should you need them.	Avid are still releasing free point patches for old versions, and upgrading between versions will cost you a small fee (the upgrade from Media Composer version 6.5 to 7 is $299).	Adobe Premiere is paid for on a subscription basis as part of the Adobe Creative Cloud. You can pay $239.88 for a yearly subscription ($19.99 per month), or if you'd rather have a monthly contract, you can pay $24.99 per month.

4.0 CONCLUSION

Editing applications, which can be used for film and video productions, have evolved overtime.

5.0 SUMMARY

Having gone through this unit, you should be able to define editing applications; describe the development of editing applications and list the factors that necessitated the development of editing applications;explain the common features of editing applications and distinguish how each editing application uses these features.

6.0 TUTOR-MARKED ASSIGNMENT

1. What issues can you identify that need to be addressed by editing applications in the future?
2. From the analysis of the three popular editing applications, which would you prefer and why?
3. From the history of the development of editing applications, list the factors that you think necessitated the continued improvements in the editing applications at the time.

7.0 REFERENCES/FURTHER READING

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