Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

SOUND RECORDING

MMPSR401

RECORD SOUND

Competence

RQF Level: 4

Learning Hours 70

Credits: 7

Sector: ICT and Multimedia

Trade: Multimedia Production

Module Type: SPECIFIC

Curriculum: TVET Certificate IV in Multimedia Production

Issued Date: May 2023

<table>
<tr><td>Purpose statement</td><td>This module is intended for the student pursuing TVET certificate IV in Multimedia production technology. In this module, students will learn and practice techniques for capturing high-quality audio recordings and exhibiting film and television sound, Special attention is given to microphone placement and recording sound on Digital Audio Workstations and builds on the knowledge and skills acquired in prerequisite courses.

At the end of this module, Students will be able to employ and apply audio recording techniques and techniques associated with signal flow, microphones, and recording for Music, theatre, film, and TV. The students will gain hands-on experience in capturing high-quality audio recordings for visual media projects with non-direct supervision</td></tr>
<tr><td>Learning assumed to be in place</td><td>Computer skills</td></tr>
<tr><td>Delivery modality</td><td>
<table>
<tr><th>Training delivery</th><th></th><th>100%</th><th colspan="2">Assessment</th><th>Total 100%</th></tr>
<tr><td colspan="2">Theoretical content</td><td>30%</td><td rowspan="4">Formative assessment</td><td>30%</td><td rowspan="4">50%</td></tr>
<tr><td colspan="2">Practical work:</td><td rowspan="3">70%</td><td rowspan="3">70%</td></tr>
<tr><td>• Group work and presentation</td><td>30%</td></tr>
<tr><td>• Individual work</td><td>40%</td></tr>
<tr><td colspan="2"></td><td colspan="3">Summative Assessment</td><td>50%</td></tr>
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Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Prepare audio equipment, tools, and materials	1.1. Audio equipment have been properly selected based on the production requirements
	1.2. Audio materials have been selected based on the production requirements
	1.3. Audio Tools have been properly selected based on the project requirements
2. Set audio Equipment	2.1. Audio input and output devices have been appropriately set based on Project Requirements
	2.2. Microphone protection equipment has been properly set based on the set environment
	2.3. Audio processing devices have been properly set based on the safety, technical, and Production requirements
	2.4. Digital audio work station Tools have been properly set based on the project requirements
3. Capture sound	3.1. Crane positioning techniques have been properly applied based on the Specific requirement of the shot.
	3.2. Microphone movement techniques have been properly applied based on the sound to be captured.
	3.3. Audio recording techniques have been properly applied according to the acoustic characteristics of the environment
	3.4. Audio signals have been properly monitored in accordance with quality project requirements.
	3.5. Audio level adjustment techniques have been properly applied based on the quality of the production requirements.
	3.6. Audio signal has been properly recorded based on production requirements.
4. Finalize sound recording operations	4.1 Audio files are suitably delivered using the client preferred delivery medium.
	4.2 Final audio is properly exported and delivered in the audio format required for post-production.
	4.3 Backup has been properly initiated based on the project safety requirements.

Knowledge, Skills, and Attitude

Knowledge	Skills	Attitude
✓ Audio formats ✓ Acoustic control ✓ Audio processing techniques ✓ Basic of electronics and electricity ✓ Knowledge of Audio Equipment	✓ Set Analytical ✓ Computer skills ✓ Quality control Analysis ✓ System analysis ✓ Knowledge of Production Workflow ✓ Location Scouting ✓ Field Recording Expertise ✓ Audio Signal Processing	✓ Active learning ✓ Critical thinking ✓ Critical listening ✓ Judgment and decision-making ✓ Time management ✓ Communication ✓ Complex problem solving ✓ Social perceptiveness ✓ Coordination ✓ Persuasion ✓ Monitoring ✓ Management of personal resources ✓ Learning strategies ✓ Service orientation ✓ Courageous ✓ Flexible ✓ Action-oriented ✓ Cooperative ✓ Goal-oriented ✓ Punctual ✓ Responsible ✓ Self-confident ✓ Self-motivated ✓ Humble ✓ Innovative ✓ Observant ✓ Patient ✓ Polite ✓ Problem-solving ✓ Physical stamina

Course content

Learning outcomes	**At the end of the module the learner will be able to:** 1. Prepare audio equipment, tools, and materials 2. Setup audio equipment 3. capture sound 4. Finalize sound recording operation
Learning outcome 1: Prepare audio equipment, tools, and materials	**Learning hours: 10**

Indicative content

- Introduction to sound recording
  - ✓ Sound recording equipment
  - ✓ Audio recording materials
  - ✓ Audio recording accessories
  - ✓ Recorded audio signal factors
    - Signal to noise ratio
    - Dynamic range
    - Frequency response
    - Sound Quality
  - ✓ Sound wave properties
    - Frequency
    - Amplitude
    - Time period
    - Velocity
    - Wavelength
- Selection of audio equipment
  - ✓ Input device
    - Microphone

- Music instrument

✓ Audio Processing devices

- Audio mixer
- Sound card/Audio interface
- Compressor
- Gate
- Limiter
- Expander
- De-esser

✓ Output devices

- Headphone
- Studio monitor

- Selection of audio materials and accessories
  - ✓ Microphone protection
  - ✓ Memory cards
  - ✓ Batteries
  - ✓ External hard drive
  - ✓ Acoustic panels
  - ✓ Soundproofing insulation
  - ✓ Microphone stand
  - ✓ Wind and pop noise protection
  - ✓ Shock and vibration
- Selection of digital audio workstation (DAW) Tools
  - ✓ Operating system
    - Windows - Based Digital audio workstation (DAW)
    - Mac-Based Digital audio workstation (DAW)
    - Cross-platform software (DAW)
  - ✓ Digital audio workstation features
    - Multitrack Recording
    - MIDI Support
  - ✓ Hardware requirements
    - Processor (CPU)
    - RAM (Random access memory)
    - Storage

- Graphic card

Resources required for the learning outcome	
Equipment	Computer, Headphones, Microphones, Audio mixer, Sound card/Audio interface, Compressor, Gate, Limiter, Expander, De-esser
Materials	Batteries, XLR cables, TS cables, TRS cables, Power supply cable, Memory card
Tools	Audio Recorder, Audio Interface, DAW(Digital audio software)
Facilitation techniques	▪ Group discussion ▪ Demonstration ▪ Trainer guided ▪ Practice exercises
Formative assessment methods	▪ Written assessment ▪ Practical assessment ▪ Performance assessment ▪ Oral assessment

Learning outcome 2: Setup Audio equipment	**Learning hours: 20**

Indicative content

- Set up of audio input device
  - ✓ Microphone
    - Placement
    - Polar pattern
    - Power
  - ✓ Musical instrument
    - Electric guitar
    - Piano
    - Electronic drum
  - ✓ Audio interface
    - Input and output

        - Latency

- Set up audio output device
    - ✓ Headphone
    - ✓ Monitor
- Audio Connection
    - ✓ Audio Cables
        - XRL
        - TRS
        - TS
        - RCA
- Microphone protection set up
    - ✓ Pop filter
    - ✓ Shock mount
    - ✓ Microphone windshield
    - ✓ Audio cable protection
    - ✓ Storage and transport
- Audio processing devices set up
    - ✓ Signal chain placement
    - ✓ Audio connection
    - ✓ Computer
    - ✓ Sound card
    - ✓ Equalizer
    - ✓ Limiter
    - ✓ Gate
    - ✓ Compressor
- Digital audio workstation set up
    - ✓ Digital audio workstation installation
        - DAW installation
        - Driver and ASIO settings
        - Plugin format
    - ✓ Digital audio workstation settings
        - Input level
        - Recording format

- Recording channels
- Buffer size
- Monitor settings

✓ Audio system testing

- Connection
- Power On
- Channel testing

Resources required for the learning outcome	
Equipment	Computer, Headphones, Microphones, Audio mixer, Sound card/Audio interface, Compressor, Gate, Limiter, Expander, De-esser
Materials	Sound proofing materials, Windshield, Memory card, Batteries, XLR cables, TS cables, TRS cables, RCA cables, Power supply cable
Tools	Audio Recorder, Audio software, Boom pole
Facilitation techniques	▪ Group discussion ▪ Demonstration ▪ Trainer guided ▪ Practice exercises
Formative assessment methods /(CAT)	▪ Written assessment ▪ Practical assessment ▪ Performance assessment ▪ Oral assessment

Learning outcome 3: Capture sound	**Learning hours: 30**
Indicative content	

- Application of crane positioning techniques

✓ Overhead boom

✓ Front boom

✓ Side boom

✓ Follow boom

✓ Telescoping boom

✓ Stationary boom

- Application of microphone movement techniques
  - ✓ Panning
  - ✓ Stereo imaging
  - ✓ Tracking
  - ✓ Depth and perspective
  - ✓ Sound source isolation
- Application of audio recording techniques
  - ✓ Blumlien pair
  - ✓ Mid-Side techniques
  - ✓ Spaces omnis
  - ✓ A-B techniques
  - ✓ Close-Mid-Far techniques
  - ✓ Baffled omni
  - ✓ Decca tree
- Monitoring of audio signal parameters
  - ✓ Level monitoring
    - Peak level
    - RMS (Root mean Square) level
    - VU (Volume unit) Level
  - ✓ Frequency response monitoring
    - Frequency range
    - Frequency balance
    - Impulse response
  - ✓ Phase monitoring
    - Phase shift
    - Phase difference
    - Phase coherence
  - ✓ Stereo image
  - ✓ Dynamic range
  - ✓ Distortion and artifacts
  - ✓ Time based effect
- Application of audio level adjustment techniques
  - ✓ Gain/Trim
  - ✓ EQ

- ✓ Fader riding
- ✓ Compression
- ✓ Automation
- ✓ Limiting

- Verification of recorded audio signal factors
  - ✓ Sound quality
    - Tonal balance
    - Sonic characteristics
  - ✓ Clarity
  - ✓ Signal to noise ratio
  - ✓ Dynamic range
  - ✓ Frequency response

Resources required for the learning outcome	
Equipment	Computer, Headphones, Microphones, Audio mixer, Sound card/Audio interface, Compressor, Gate, Limiter, Expander, De-esser
Materials	Sound proofing materials, XRL Windshield, Memory card, Batteries, XLR cables, TS cables, TRS cables, RCA cables, Power supply cable
Tools	Audio recorder, Audio Recording software
Facilitation techniques	▪ Group discussion ▪ Demonstration ▪ Trainer guided ▪ Practice exercises
Formative assessment methods /(CAT)	▪ Written assessment ▪ Practical assessment ▪ Performance assessment ▪ Oral assessment

Learning outcome 4: Finalize sound recording operation	**Learning hours:10**
Indicative content	
● Transferring audio files	

- ✓ Storage medium
  - External drive
  - Solid-state drive(SSD)
  - Network-attached storage(NAS)
  - Cloud storage services
- ✓ Use file transferring methods
  - USB cable
  - Bluetooth
  - Wi-Fi direct
  - Email attachments
  - Cloud storage service
  - File transfer apps

- Delivering final audio
  - ✓ File formats
  - ✓ Sample Rate
  - ✓ Bit Depth
  - ✓ Channel Configuration
    - Mono
    - Stereo
    - Multichannel
- Initiation of backup
  - ✓ Local backup
    - External hard drives
    - Network-attached storage
  - ✓ Cloud backup
    - Online storage services
    - Automated backup software
  - ✓ Redundant backup

Resources required for the learning outcome	
Equipment	Computer, Headphones, Microphones, Audio mixer, Sound card/Audio interface, Compressor, Gate, Limiter, Expander, De-esser

Materials	Sound proofing materials, XRL Windshield, Memory card, Batteries, XLR cables, TS cables, TRS cables, RCA cables, Power supply cable, Memory card, Hard drive
Tools	Audio recorder, Audio Recording software Boom pole
Facilitation techniques	▪ Group discussion ▪ Demonstration ▪ Trainer guided ▪ Practice exercises
Formative assessment methods /(CAT)	▪ Written assessment ▪ Practical assessment ▪ Performance assessment ▪ Oral assessment

Integrated/Summative assessment

Integrated situation

AMIZERO Center, is an NGO which is committed to realizing the rights of all children to help them build a strong foundation through different programs such as child health, Nutrition, Early childhood development, Education and Child protection.

So, AMIZERO Center contracted M. Records studio to record a short theater which shows the causes and consequences of school drop outs, but AMIZERO Center has criticized that the product was not at the required standards.

Now AMIZERO Center is preparing a mobilization which includes live music performance and interviews which encourages parents to take care of their children's nutrition. The live music performance and interviews are a 3-hours event and there will be two vocalists and one guitarist with an electric guitar.

AMIZERO Center needs to hire a competent sound recordist that will capture sound of their live music event and interviews at a good standard. As a multimedia technician you are hired to record that event. The recorded sounds must be wave and must be submitted to the NGO office within 3 hours.

Resources

Tools	▪ Audio Recorder ▪ Audio software ▪ Boom pole
Equipment	▪ Computer ▪ Audio mixer ▪ Mixing console

	▪ Headphones ▪ Microphones
Materials/ Consumables	▪ Microphone protection ▪ Memory cards ▪ Batteries ▪ External hard drive ▪ Acoustic panels ▪ Soundproofing insulation ▪ Microphone stand ▪ Wind and pop noise protection ▪ Shock and vibration

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Learning Outcome. 1. Prepare audio equipment, tools, and materials (20%)	1.1 Audio equipment are selected	Input devices are selected			2
		Processing devices are selected			2
		Output device are selected			2
	1.2 Audio materials and accessories are Selected	Microphone protection are selected			2
		Microphone stands are selected			2
		Wind and pop noise protection are selected			2
		Audio cables are selected			2
		Batteries are selected			2
	1.3 audio tools have are selected	Software is selected			2
		Hardware are selected			2
	2.1 Audio input and output are set up	Microphone are set up			4

Learning Outcome. 2. Set audio Equipment ()		Electric guitar is selected			2
	2.2 Microphone protections are set up	Pop filters are selected			2
		Microphone windshield			2
		Microphone Stands are selected			2
		XRL are selected			2
		TRS are selected			2
	2.3 Audio processing devices are set up	The equalizer is set up			2
		The compressor is set up			2
		Limiter is selected			2
		The audio mixer is selected			2
	2.4 Digital audio workstation tools are set	Sample rate is set up			2
		The buffer size is set up			2
		MultiChannel tracks have been set up			2
Learning Outcome.3. Capture sound (35%)	3.1 Crane positioning techniques are applied	The overhead techniques have been applied			3
		Front boom technique have been applied			2
		Stationary boom technique has been applied			2

	3.2 Microphone movement techniques are applied	Stereo imaging movement technique has been applied			3
		Tracking movement technique has been applied			2
	3.3 Audio recording techniques are applied	Midi-siderecording techniques has been applies			2
	3.4 The audio signals are monitored	Signal levels have been monitored			3
		Stereo image has been monitored			2
		Dynamic range has been monitored			2
	3.5 Audio levels are adjusted	Gain is adjusted			3
		EQ is Adjusted			3
	3.6 Audio signals are recorded	The Recorded sound quality is verified			3
		Dynamic range is verified			3
		Frequency response is verified			2
Learning Outcome.4. Finalize sound recording operation (15%)	4.1 Audio files are delivered	Storage medium is selected			1
		Storage medium			1
		file transferring			1
	4.2 Final audio are exported	File format is select			3
		sample rate is selected			3
		Channel configuration is selected			2

	4.3 Backup is initiated	Lock backup is initiated			2
		Redundant backup is initiated			2
Total marks					100
Percentage Weightage					100%
Minimum Passing line % (Aggregate): 70%					

References

1. David Miles Huber, Robert E. Runstein. (2006-10-15), Modern Recording Techniques, Focal Press/Elsevier
2. Bobby Owsinski. (2004), The Recording Engineer's Handbook, Artistpro
3. David Reese, Lynne Gross, Brian Gross. (2009), Audio Production Worktext: Concepts, Techniques, and Equipment, Focal Press
4. Julian Ashbourn. (2021), Audio Technology, Music, and Media: From Sound Wave to Reproduction, Springer
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6. John Eargle. (2004), The Microphone Book, Second Edition: From mono to Stereo to surround - a guide to microphone design and application, Focal Press