Unit 17: Audio Production Processes and Techniques

Unit code: M/600/0119

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

This unit aims to encourage learners to progress beyond the basic use of audio equipment, developing a deeper understanding of sound and acoustics together with techniques for audio capture, mixing and editing skills.

Unit introduction

The importance of sound and music to media productions should never be underestimated. Sound and music not only set the mood and emphasise the emotional content of the production but also help focus the viewer's or listener's attention on the visual content. The quality of sound and its design are vital to all aspects of media including film, television, radio broadcast, podcasts and internet broadcasting. As the quality of domestic equipment increases, and more people buy surround sound systems, consumers demand better quality sound. This will apply to all areas from costume dramas, documentaries, sports and news broadcasts to animations, games and live music broadcasts.

Professionals in the industry know that clarity and sound integrity are of utmost importance. This clarity is produced by applying a good knowledge of the basic principles of sound recording and production techniques, which lead to the intelligibility of dialogue, the correct balance of music and effects and the appropriate sound treatment for different transmission media. Developing an understanding of the basic language of sound, along with associated listening skills, will help learners to critically evaluate their own and other learners' work and compare it to past and current practitioners.

This unit allows learners to develop beyond the basic use of audio and radio equipment, extending their knowledge and understanding of technical characteristics through theoretical input and investigation. It allows learners to take an experimental approach, gaining new production skills and discovering the effects on recorded sound of changing equipment or location. Learners will develop their editing and post-production techniques and their technical and aesthetic understanding of sound and music production for a media product. It is not intended that learners study the mathematics and physics of sound in this unit.

Emphasis on listening skills, communication skills and the basic principles of sound engineering are in line with industry expectations of learners. Employers in the industry look out for good communication skills as well technical expertise and there are opportunities to develop communication skills in this unit.

Learning outcomes

On completion of this unit a learner should:

1 Understand characteristics of different acoustic environments in relation to recording sound

2 Understand conventions in audio production and post-production

3 Be able to capture and record sound from different sources

4 Be able to mix and edit recorded sound.

Unit content

1 Understand characteristics of different acoustic environments in relation to recording sound

Indoor acoustics: the principles of sound and acoustics; studio-based acoustics; live room; dead room; in-situ recording; surface types and properties; reverberation; sound proofing; making the most of available acoustic areas; screening

Outdoor acoustics: actuality; sound bites; background atmosphere; unwanted noise; unwanted ambience; wind noise

Simulated acoustics: effects units; processors; compression and limiting; software; surround sound; mono; stereo; multi-channel; phase; pitch; time delay; indirect recording

2 Understand conventions in audio production and post-production

Technical conventions: studio layout and operation; recording and playback formats; file transfer; non-linear recording systems; delay lines; effects; sequences; production and post-production stages and processes; production roles

Legal and ethical issues: copyright and fair dealing; performing rights; licences; contracts; profanity, blasphemy; representation

3 Be able to capture and record sound from different sources

Audio capture: studio and outside broadcast; interviews; atmosphere; live performances and conferences; monologue; dialogue; group debate; audience interaction; participation

Microphone types and characteristics: dynamic; capacitor; condenser; ribbon; hand-held; stand; tie-clip; rifle; boom; associated polar diagrams (omni, cardioid, hyper-cardioid); radio microphones; stereo

Pre-recorded sources: sound file formats; file conversion; as-live recordings; live recordings; concerts; interview material; commentary; library material

Recording equipment: interfaces; cables and gain stages; mixer inputs and outputs; signal flow and levels; metering and monitoring; the integrity of the sound signal; direct injection; multi-track; stereo and single-track recording; analogue recording; digital recording; linear; non-linear; storage; microphones

4 Be able to mix and edit recorded sound

Mixing audio: for radio; for music; sound for games; mixing for record release; production possibilities; audio post-production; live sound; recordings; studio recordings; analogue; software; audio processing; compression and equalisation; the use of reverberation and effects; synchronisation; recording and sequencing software; midi; synthesisers; sampling software; analogue to digital converter (ADC)

Editing: speech; music; background noise and ambience; content; corrections; non-linear editing; edit lists

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 describe characteristics of different acoustic environments in relation to recording sound with some appropriate use of subject terminology [IE]	**M1** explain characteristics of different acoustic environments in relation to recording sound with reference to detailed illustrative examples and with generally correct use of subject terminology	**D1** comprehensively explain characteristics of different acoustic environments in relation to recording sound, with elucidated examples and consistently using subject terminology correctly
P2 describe conventions in audio production and post-production with some appropriate use of subject terminology [SM]	**M2** explain conventions in audio production and post-production with reference to detailed illustrative examples and with generally correct use of subject terminology	**D2** comprehensively explain conventions in audio production and post-production with elucidated examples and consistently using subject terminology correctly
P3 produce recorded sound from a variety of sources with some assistance [CT]	**M3** produce recorded sound from a variety of sources to a good technical standard with only occasional assistance	**D3** produce recorded sound from a variety of sources to near-professional standards working independently to professional expectations
P4 produce mixed and edited sound tracks working within appropriate conventions and with some assistance. [CT]	**M4** produce mixed and edited sound tracks to a good technical standard, showing some imagination and with only occasional assistance.	**D4** produce mixed and edited sound tracks to near-professional standards, showing creativity and flair and working independently to professional expectations.

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

It is vital in this unit that learners understand the importance of learning the basic principles of audio recording and how to develop their listening skills. They should also become aware of the need to experiment with many different types of music and sound. They should be encouraged to experiment with natural, acoustic sounds and to listen to how those sounds change in different acoustic environments. Learning outcome 3 gives learners the scope to record and mix sound from many sources of their choice, which can reflect an area of personal interest. The possibilities can be outlined in theory and learners then encouraged to experiment with the equipment available.

This unit is part theory, part practice. An active experimental approach is encouraged for the practical elements. Demonstrations and class lectures would be appropriate for teaching the theory, although learners should be encouraged to 'fact find'. They should be encouraged to work and experiment individually and in pairs, taking care to generate, for themselves, sufficient evidence of their discussions and the results. This will be done by keeping a log or journal of their experiences.

Learners should be encouraged to listen to and analyse different acoustic environments. This can be done without the use of complex mathematical formulae as the descriptions can be framed in the context of the 'sound spectrum' and where the sounds fit into the spectrum. Learners can describe how the acoustic environment affects the 'clean' sound and it will be useful for learners to not only electronically record the sounds for presentation but also to record their written descriptions of the sounds in their sound log or journal. It is useful to develop a common graphic representation of the sound spectrum so that experiences can be documented graphically as well as in words. Learners should be encouraged to explore and note sounds that they experience in their everyday lives. They can also be encouraged to observe how the sound and its environment affect the emotional content of productions.

A simple introductory exercise would be to record the same sound with different microphones and varying pick up patterns. Learners can then discuss the different characteristics of the microphones and their usage.

Exercises can be designed for either group or individual work, but learners will get the greatest benefit from working and discussing topics together. It is best if the exercises follow the tutor's instruction on the concepts needed for the exercise. After this, learners should be comfortable with exploring the subjects on their own. Learners can be encouraged to make presentations of their recordings and discuss the problems encountered and how they approached solving them.

There are several trade journals that give useful information on recording and production techniques and in this way learners can obtain information about basic principles and keep up with techniques currently being used by professionals. Many of the microphone and other equipment manufacturers give excellent technical and application information on their websites.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way of planning the teaching and assessment of this unit.

Topics and suggested assignments and activities
Introduction to unit and unit assessment.
Whole class sessions covering acoustic environments, including visits to relevant areas where learners can encounter varying acoustic properties.
Assignment 1 – Acoustic Environments Brief from a trade magazine to write a piece on how acoustic environment can affect recorded sound. Article to include diagrams and technical information. Learners will: • receive assignment overview • research characteristics of different acoustic environments, natural and artificial • write article.
Whole class sessions with examples of equipment and discussion of techniques.
Assignment 2 – Conventions in Audio Production and Post-production Brief to prepare and deliver a presentation to a recording industry career seminar on the processes and conventions in audio production and post-production, with reference to copyright and contracts. Learners will: • receive assignment overview • carry out individual research • collate evidence and analyse it • prepare presentation • give presentation.
Assignment 3 – Capture Environment Request from prospective employer to submit a portfolio of recordings from a variety of sources and acoustic environments. Learners will: • receive assignment overview • prepare materials and diagrams • carry out individual practical sessions to complete recordings.
Whole class sessions on mixing, realisation, and editing skills (to include individual learner skills development and practical exercises).
Whole class sessions on technical and legal considerations.

Topics and suggested assignments and activities
Assignment 4 – Mixing and Editing Brief from a production company to edit and mix a series of supplied multi-track recordings. Learners will: • receive assignment overview • carry out individual practical sessions to produce sound tracks • prepare materials (including screenshots and diagrams).

Assessment

Evidence for assessment

Evidence for achievement of learning outcomes 1 and 2 might be presented as a report or blog with audio and graphic examples. If the report is given as a presentation, the presentation must be recorded for the purposes of internal and external verification.

For learning outcomes 3 and 4 evidence will comprise recorded audio material along with reports describing the processes undertaken. Another form of evidence might be observations of learners carrying out procedures (for example, positioning microphones) supported by the learners' accompanying documentation, such as sketches of microphone positions. If this evidence is recorded as witness or observation reports care must be taken to ensure that at least 50 per cent of such assessments are subject to internal verification.

Recordings produced should exemplify experimentation with different recording and mixing equipment and the effect on sound of changing the recording location. Reports can be in the form of logs, portfolios or blogs, which should contain evidence of how the recordings were planned and executed. This could include track sheets, pre-production planning schedules, and studio and equipment booking procedures. Alternatively, learners could produce content for a website designed for training and learning purposes.

For some elements of this unit, and for some learners, a formal viva voce assessment might be appropriate. When more than one learner in a cohort is assessed in this way care must be taken to ensure that all learners are asked equivalent questions, and that all are given equal opportunities to expand or clarify their answers. Interviewers must also ensure that questions are not phrased in such a way as to provide or suggest an answer. Formal vivas should be recorded for the purposes of internal and external verification and at least 50 per cent of such assessments must be internally verified.

Application of grading criteria

When applying the grading criteria tutors should follow the advice given below. Please note that any examples of evidence given here are indicative only. This advice is not inclusive and the examples need not be included in a learner's work in order for that learner to achieve the exemplified grade.

Pass

To achieve a pass grade, learners must achieve all the pass grade criteria. For each of the criteria learners must present evidence that addresses each italicised sub-heading of the content for the learning outcome.

P1: learners will give accurate, relevant and substantially full, though not absolutely complete, descriptions of the acoustic environments that they have encountered and must use some appropriate and relevant technical terms in their descriptions. A learner's notes might for example, include the observation that a room which appeared to have quite a 'live' acoustic became quite 'dry' once the audience arrived and was seated.

P2: learners will show a basic but accurate understanding of conventions in audio production and post-production including, for example, recording and playback formats, copyright issues, the use of delay lines and issues, such as profanity and blasphemy, relating to content.

P1 and P2: evidence will reflect a basic understanding of technical terminology but learners will generally be unsure about this vocabulary and will make fairly frequent mistakes when they do use it.

P3: learners will be able to produce recorded sound from different locations. They will show by doing this that they have understood the recording process and the care that needs to be taken of the sound from source to monitoring and reproduction, but their results will not always be technically consistent. The quality of sound should be acceptable and any interference from outside sources – particularly where location recording is involved – should be minimal.

P4: learners will show that they have some sense of balancing sources, creating appropriate fades, and that they are able to use the effects and processors on a sound mixer. The quality of the sound should be acceptable in that any voices are intelligible and also any equipment noise or distortion from any source does not detract from the final mix. In terms of the imaginative qualities of their work, learners will not move beyond the conventional.

P3 and P4: learners should demonstrate a methodical approach to recording and the presentation processes, though results will not always be consistent. When engaged in practical activities, learners will need frequent assistance and support, though they will take note of and make use of this help when it is given. If they are in frequent need of such help but fail to make positive use of it they should not be considered for a pass grade for this unit.

Merit

To achieve a merit grade, learners must achieve all the pass and all the merit grade criteria. For each of the criteria learners must present evidence that addresses each italicised sub-heading of the content for the learning outcome.

M1: learners will explain how changes in acoustic environments affect sound and how or why they might work to take account of these factors. They will refer to well-researched and appropriate examples but will not elucidate these examples to show how they illustrate the points they support. Learners will show a good understanding of the topics, revealing consideration of how or why the issues mentioned have importance. When discussing acoustic environments and microphone types, a learner might write, 'The reflections from the walls of the room that we recorded in created a ringing sound at the microphone and interfered with the sound source. To alleviate this we used a directional microphone pattern and moved the microphone close to the source so that the reflections were less evident.'

M2: learners will explain how to manage a project from inception through to conclusion, showing awareness of the constraints and potential of the equipment that they are likely to use. They will give examples of the sort of problems they might encounter and the processes used to get around them. They will be able to show that they have read some of the subject material now readily available and understand how to plan a production taking account of any legal and copyright issues.

M1 and M2: learners will use technical vocabulary for the most part correctly, but may make mistakes or be unsure about usages at times.

M3: learners will produce recordings of several sound sources using different microphone techniques, positions and patterns. They will show from the recordings that they are able to experiment methodically to achieve the desired results. This follows normal professional practice. Learners will show confidence in the handling of equipment and be aware of technical problems such as the signal to noise ratio, distortion and other unwanted noise.

M4: the mix and edits presented by learners will be clear and well balanced. There will probably be evidence that they are aware that balances need to be changed throughout the mix and that fade-ins and fade-outs are carefully planned and appropriate to the material. Learners might have judiciously used effects to add colour and interest to the production and also may have used processors to correct dynamic and sonic problems. There will be some imaginative thought behind the work so that technical skills will be employed with some inventiveness.

M3 and M4: learners will need little assistance, though typically they will still need some support when dealing with more complex technology or trying to apply more sophisticated techniques. Like the pass grade learner, they will respond positively to any help given.

Distinction

To achieve a distinction grade, learners must achieve all the pass, all the merit and all the distinction grade criteria. For each of the criteria learners must present evidence that addresses each italicised sub-heading of the content for the learning outcome.

D1: learners will provide fuller and more extensive explanation, selecting and applying examples more effectively to support those explanations and drawing out of the examples precisely what it is that exemplifies the points they illustrate. When discussing acoustic environments and microphone types, a learner might write, 'The reflections from the walls of the room that we recorded in created a ringing sound at the microphone and interfered with the sound source. We were aware that we could use a directional microphone pattern and moved the microphone closer to the source. However, this would not give the desired sound, so we found materials that would deaden the reflections and taped them to the walls. We changed the position of the sound source and used up-ended tables covered with blankets to make improvised screens.'

D2: learners will present comprehensive explanations of conventions in audio production and post-production, justifying points made through carefully chosen examples and drawing out of those examples precisely what is that exemplifies the points they illustrate.. They will show that they have read some of the available material in depth. They will demonstrate that they know how to plan a project using the correct equipment, anticipating problems whilst also being aware of the constraints. They will explain in detail any legal or copyright issues and their impact on the planning stage in terms of rights that they might be infringing and their own rights as a producer.

D1 and D2: technical vocabulary will be secure and used correctly and confidently at all times.

D3 learners will have worked independently to produce multi-track recordings to a quality near to that expected for professional distribution. The individual tracks will be technically correct and will reflect the correct choice of equipment, using techniques appropriate in each situation.

D4: learners will have worked independently to produce sound tracks to a quality near to that expected for professional distribution. The finished products will be technically correct, and the productions will show that the learners have been creative in the use of the available media, applying their technical skills not just with imagination but with ingenuity and even elegance. Decisions made have been taken with the whole project in mind as well as the individual parts. The productions will have the feel of a marketable product.

D3 and D4: in all practical activity learners will be capable of working autonomously and effectively. The term 'working independently' means that they are able to work on their own initiative, do not need constant support or supervision, give the work their full commitment, work positively and cooperatively with others, and meet deadlines. In other words, they have the kind of self-management skills that would be expected of them in a professional context. Note also that this criterion should not be taken to mean that learners do not seek advice or that they work without discussing things with their tutor, but rather that they are not dependent upon the support of others and that when they take advice they weigh it carefully for themselves.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Pearson assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, M1, D1	Assignment 1 – Acoustic Environments	Brief from a trade magazine to write a piece on how an acoustic environment can affect recorded sound. Article to include diagrams and technical information.	• Research notes. • Summaries of research. • Written articles.
P2, M2, D2	Assignment 2 – Conventions in Audio Production and Post-production	Brief to prepare and deliver to a career seminar on the recording industry a presentation on the processes and conventions in audio production and post-production, with reference to copyright and contracts.	• Research notes. • Summaries of research. • Slides and notes for presentation. • Recording of presentation. • Tutor observation. • Report.
P3, M3, D3	Assignment 3 – Capture Environment	Brief from prospective employer to submit a portfolio of recordings from a variety of sources and acoustic environments.	• Report on microphone and equipment choices. • Layout and connection diagrams. • Track sheets and log. • Portfolio of recordings.
P4, M4, D4	Assignment 4– Mixing and Editing	Brief from a production company to edit and mix a series of supplied multi-track recordings.	• Tutor observations. • Audio recordings. • Recording log. • Track sheets.

Links to other BTEC units

This unit forms part of the BTEC Creative Media Production suite. This unit has particular links with the following units in the BTEC Creative Media Production suite:

Level 2	Level 3
	Audio Books and Guides
	Introduction to Music Technology
	Music Recording

Essential resources

Equipment should include portable recording equipment, different types of microphones and stands, non-linear recording and editing facilities (preferably of industry standard). A recording studio, properly structured for learning purposes, is desirable. Tape recording and analogue editing may still be relevant for a number of years, but should no longer be a primary activity, although the principles used are essential to the understanding of the language and operation of non-linear software. Such equipment should, therefore, be available. The library should hold copies of up-to-date books on sound recording, as well as relevant industry journals.

Employer engagement and vocational contexts

Centres should develop links with local recording studios and production companies. Local producers, musicians and songwriters are usually willing to come in and talk about techniques and methods for recording and production, often motivating learners and adding to the vocational context.

ScreenSkills, the Sector Skills Council for the creative media sector, has a substantial section of its website dedicated to careers, including job descriptions.

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	exploring issues with regard to different acoustic environments identifying questions to answer and problems to resolve when utilising new studio techniques through experimentation
Creative thinkers	trying out alternatives and following ideas through when producing recorded sound, and mixing and editing sound asking questions to extend their thinking when applying new production techniques
Self-managers	working towards goals when mixing and editing sound responding positively to change, seeking advice and support when needed whilst developing new techniques.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Reflective learners	reviewing progress, acting on the outcomes
Team workers	collaborating with others to work towards common goals through participating in production meetings.

Functional Skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
Manage information storage to enable efficient retrieval	saving written and creative work
Follow and understand the need for safety and security practices	using computers to create music productions
Troubleshoot	operating workstations
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	researching for assignments
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	preparing work for assessment
Bring together information to suit content and purpose	preparing work for assessment
Present information in ways that are fit for purpose and audience	preparing and delivering presentations.

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