Unit 64: Introduction to Music Technology

Unit code: F/502/5693

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

This unit aims to introduce learners to music technology equipment and techniques. Learners will become familiar with a range of equipment commonly in use for the creation of music, and will produce a variety of recordings utilising the skills developed through the unit.

Unit introduction

In the modern media, recording and live sound environment it is essential that engineers, producers and assistants are able to use music technology equipment as well as specialised sound facilities. Many composers and arrangers create products with their own computerised facilities and then bring them to the professional recording studio or live venue for performance, overdubbing and final mixdown, often to picture. This can be in the realm of film music, games, multimedia presentations, music CDs, radio and television productions, talking books, theatre and many other media areas.

Nowadays it is vital that sound engineers know how the sequencing packages and outboard devices interface and synchronise with each other and with other equipment. The engineer often needs to correct timing, intonation and sonic problems associated with the production, as well as deal with complex synchronisation, file transfer and format issues.

This unit is concerned with developing learners' basic understanding of the equipment and processes in the field of music technology and how they can be used to enhance musical requirements. The unit, therefore, has a strong creative element. Learners will use a variety of resources including software, hardware and specifically dedicated equipment.

The learning outcomes follow the logical sequence of learning how the equipment works, how to connect the equipment and how to use it creatively.

The unit is designed to prepare learners for work in the media industries either in an employed or freelance capacity. It is also appropriate for learners wishing to enhance their own music potential.

Because the study of music technology encompasses music and creativity, numeracy and literacy, advanced technology and IT skills, and group and team working, there are excellent opportunities for cross-curricular learning and innovative approaches to teaching.

Learning outcomes

On completion of this unit a learner should:

1 Be able to connect, set up and test music technology equipment

2 Be able to produce a virtual performance of a given piece of notated music

3 Be able to produce a creative arrangement of an existing piece of music

4 Be able to design and create a piece of original music using available resources.

Unit content

1 Be able to connect, set up and test music technology equipment

Playback equipment: studio facilities (multi-track, stereo); mixers; microphones

Monitoring systems: speakers and the monitoring environment; amplifiers; the recording and playback chain; connections and gain structures; safety and monitoring levels

Sound adjustment: reverberation; effects and processors; compression and limiting; equalisation

Interfaces: cables and connectors; universal serial bus (USB); FireWire; musical instrument digital interface (MIDI) cables; ethernet

Health and safety: electrical risks; physical risks; safe handling and storage; noise levels

2 Be able to produce a virtual performance of a given piece of notated music

Sequencing systems: MIDI specifications; MIDI connections; MIDI manager; MIDI channels (sending and receiving); MIDI controller information; MIDI files

Computer systems: software sequencing packages; computer platforms and operating systems; software synthesis and sampling packages; control surfaces

Keyboards: keyboards and keyboard interfaces; synthesiser keyboards with built-in sequencing software; keyboards with built-in sampling technology

Sound generators: synthesisers; samplers and sampling technology; sound modules; multi-timbral systems

3 Be able to produce a creative arrangement of an existing piece of music

Interpretation: correct interpretation of articulation; expression; chord symbols; idiomatic awareness; accuracy of pitch; rhythm; tempo; dynamics; phrasing and articulation; score layouts; transposition instruments; using the technology appropriately for the musical idiom or genre

Realisation: enter notes using step-time and real-time input; creative and interpretative decisions

Editing skills: programme change; velocity; expression; pitch bend; note length; quantisation; accuracy; drum parts

Timbre: selection of appropriate sounds; sound characteristics and texture; sonic masking and balance; voicing techniques; texture; density; arrangement and orchestration

4 Be able to design and create a piece of original music using available resources

Composition: eg structure, form, genre, statement, repetition, inversion, difference; individuality; originality; composers' rights

Sound design: eg sampling techniques, waveform structures, waveform editing techniques

Availability: software inputs; analogue and digital inputs; editing sources; sound libraries; playback equipment; file transfer, formats and compatibility; copyright issues

Mastering: eg mastering to CD, PQ codes, mp3, internet distribution, compression, loudness, equalisation, sonic problems

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	connect, set up and test music technology equipment with some assistance [SM]	**M1**	connect, set up and test music technology equipment to a good technical standard and with only occasional assistance	**D1**	connect, set up and test music technology equipment to a technical quality that reflects near-professional standards, working independently to professional expectations
P2	produce a virtual performance of a given piece of music, working within appropriate conventions and with some assistance [CT; SM]	**M2**	produce a virtual performance of a given piece of music to a good technical standard, showing some imagination and with only occasional assistance	**D2**	produce a virtual performance of a given piece of music to a technical quality that reflects near-professional standards, showing creativity and flair and working independently to professional expectations
P3	produce a new arrangement of an existing piece of music, working within appropriate conventions and with some assistance [CT; SM]	**M3**	produce a new arrangement of an existing piece of music to a good technical standard showing some imagination and with only occasional assistance	**D3**	produce a new arrangement of an existing piece of music to a technical quality that reflects near-professional standards, showing creativity and flair and working independently to professional expectations
P4	produce a piece of original music using a range of techniques, working within appropriate conventions and with some assistance. [CT; SM]	**M4**	produce a piece of original music using a range of techniques to a good technical standard, showing some imagination and with only occasional assistance.	**D4**	produce a piece of original music using a range of techniques to a technical quality that reflects 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

This unit should be primarily a practical experience, with learning about the application of music technology and associated equipment taking place through the creation of music. This could take a variety of forms, from the very structured to the more creative where learners are encouraged to explore the resources at their disposal with a more artistic approach. The approach will, of course, depend on the resources available. Emphasis should be placed on understanding both the use of the equipment and the effects that can and should be achieved with the correct choice of resources available.

It essential, however, that learners are given sufficient knowledge to support the creative process. This should include instruction on the interfacing of equipment, MIDI specifications and management protocols and a basic understanding of music notation and musical terms. To pass this unit, learners should also have a clear understanding of the computer platform that they are using and knowledge of its operating system.

The emphasis must be on applying a range of techniques used in sequencing. There should be a final product that will allow learners to demonstrate their ability to make full and appropriate use of editing techniques to produce work of a good quality. Learners should have the opportunity to present their work to their peers, as the sharing of work can be a useful way of developing understanding through discussion and criticism.

Learners should keep a log of their experiences with music technology which could include references to troubleshooting procedures that they have discovered in their work. Regular group discussions could be held on how individuals have solved (and created) problems and this would give learners the opportunity not only to pass on valuable information but to develop communication skills. Another approach may be to form small troubleshooting groups, particularly to help those who find it difficult to speak in a large group. Above all, learners should be given the opportunity to evaluate their strengths, weaknesses, successes and failures. They should also be given the opportunity to discuss any fears of the technology, how it relates to creativity and possibly limits artistic expression. These areas can also be documented in a project diary or log. It is important that learners are made aware of the difference between critical awareness and being judgemental of themselves and others. The unit can be used to encourage learners to develop their critical faculties and to identify areas where they could develop themselves, particularly in reference to team-working.

The unit is an excellent vehicle for introducing learners to different musical genres and allowing them to experiment with them. It will also stimulate discussion on issues such as copyright, the availability of live venues, sequenced tracks in live performance and the social impact of technology.

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 lectures and demonstrations on: • playback equipment • monitoring systems • sound adjustment • interfaces • health and safety.
Assignment 1: Set-up and Connection Learners will be given exercises in setting up and connecting equipment. Learners will: • receive assignment overview • have individual practical sessions in class on setting up and operating equipment • complete assessment exercises (including technical notes and diagrams) • write exercise reports • receive assessment feedback and have further opportunities to address grading criteria.
Whole-class sessions with practical demonstrations using hardware and software MIDI systems, followed by individual exercises.
Assignment 2: MIDI Sequencing Brief to create a sequenced performance in music software, from a piece of notated music. Learners will: • receive assignment overview • complete individual practical sessions • write report • receive assessment feedback and have further opportunities to address grading criteria.
Whole-class sessions on interpretation, realisation, and editing skills, followed by individual skills development and practical exercises.
Assignment 3: Cover Version Brief from a production company to produce a cover version of a given piece. Learners will: • receive assignment overview • complete individual practical sessions to produce an arrangement • write report • receive assessment feedback and have further opportunities to address grading criteria.

Topics and suggested assignments and activities
Visiting professional leads sessions on: • composition • sound design • mastering techniques.
Assignment 4: Original Piece Brief to create an effective demo of an original composition created and mastered using contemporary techniques. Learners will: • receive assignment overview • complete individual practical sessions, composing and recording • write report • receive assessment feedback and have further opportunities to address grading criteria.

Assessment

Evidence for assessment

Learners can generate evidence of achievement for all the learning outcomes for this unit using different types of technology. They should undertake a range of work in different styles, completing work to finished products. It must be remembered that this is an introductory unit to a specialist area and the evidence generated must clearly show use of a broad range of techniques in creating and recreating musical pieces. The musical genres and styles used should be as broad as possible. Learners should produce a number of sequenced performances that demonstrate their ability to use the equipment, as well as their creative abilities.

Learners should be able to express their ideas effectively using appropriate technical language and show a clear understanding of the processes used in realising, producing and recreating music by means of technology.

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.

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 demonstrate a basic understanding of interconnections and the processes involved in connecting the various pieces of equipment. They will show an ability to operate at appropriate monitoring levels and monitoring environments. The evidence will show a methodical approach to the setting up and testing of the equipment, though results will not always be consistent and documentation will be brief.

P2: learners will create a multi-track piece from a given piece of music using an appropriate DAW (Digital Audio Workstation) with some assistance from a tutor or technician. The piece will ideally combine audio and MIDI tracks though it is accepted that learners may favour a method of working which focuses on one more than the other. The performance itself will accurately reflect the arrangement of the given piece, both tonally and rhythmically.

P3: learners will produce a new arrangement of a given piece of music, retaining the original melody and chords accurately in creating an alternative arrangement which does not detract from the composer's original intention. Learners may require some assistance to achieve this.

P4: learners will produce a recording of their own composition, utilising a range of techniques in available resources for both multi-track and stereo mastering to a technically acceptable standard..

P1, P2, P3 and P4: 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.

P2, P3 and P4: in terms of the aesthetic or imaginative qualities of their work, learners will not move beyond the conventional, but the conventions applied will be appropriate to the form or genre within which they are working.

M1: learners will solve straightforward technological problems with only occasional assistance and documentation will refer to well-researched and appropriate examples. They will show a good understanding of the equipment and procedures, revealing consideration of how or why the issues mentioned in the content for this learning outcome have importance. They may, for example, have researched legislation concerning monitoring levels and how it affects the creative and professional process.

M2: learners will have completed the tasks with little assistance and will show that they have solved many of their own problems by referring to books, software help pages, manuals and magazines. They will produce performances using a range of techniques and pieces of equipment. They will show from the virtual performances that they are able to experiment methodically to achieve the desired results. Learners will show confidence in the handling of equipment and awareness of technical problems, such as the signal to noise ratio, distortion and other unwanted noise.

M3: learners will present arrangements that are musically competent, clear and well balanced. There will probably be evidence that the learner is aware of how sounds complement each other and how they have experimented with editing processes to achieve the desired results. They will show how they have discarded some results and why. They will have documented their progress regularly and will be able to convincingly show evidence of the choices that they have made.

M4: learners will show that they have successfully created an original piece of music and that they have managed the project from inception through to conclusion, being aware of the constraints and potential of the equipment they have been using. They will document the problems they have encountered and the process used to get around them with only occasional assistance.

M1, M2, M3 and M4: throughout their work learners will show facility and some confidence in relation to skills and the handling of equipment. Work will be approached methodically, with adequate preparation, and ideas will be worked out. Processes will be undertaken with care and, generally speaking, thought will be put into the work. When engaged in practical activities, 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 respond positively to any help given.

M2, M3 and M4: learners will still be working within recognisable generic conventions, but there will be some imaginative thought behind the work so that technical skills and codes and conventions will be employed with some inventiveness.

D1: learners will work independently in a manner that bears comparison to that of a professional using music technology equipment. They will solve their own problems and document the processes for setting up and testing equipment used. They will show that they have taken care of the equipment and have left it in a usable condition for the following learner. This would include, for example, properly coiling and storing leads, and reporting any faults.

D2: learners will present virtual performances that they have created on their own initiative, and will demonstrate flair and confidence whilst working to guidelines in the score and arrangement of the given piece.

D3: learners will create an arrangement to a technical quality that reflects near-professional standards whilst retaining accurately the melodic integrity of the composer's original.

D4: learners will present original compositions that are substantial and comprehensive in scope with lucid, well-described and appropriate examples of how they approached the piece and what technical and creative problems they faced.

D1, D2, D3 and D4: the phrase 'to a technical quality that reflects near-professional standards' means that technical and production skills are beginning to approach the professional standard and they bear comparison with it. It does not mean the learner has to achieve actual professional standards as that would be unrealistic at Level 3. In all practical activity, distinction grade 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.

D2, D3 and D4: learners will apply their technical skills not just with imagination but with ingenuity and even elegance, and codes and conventions will be used with occasionally surprising results.

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 Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, M1, D1	**Assignment 1**: Set-up and Connection	Learners will be given a series of scenarios mirroring likely industry situations to connect, set up and test equipment.	Portfolio of evidence to include: • technical notes and diagrams • individual exercise reports • tutor observation records.
P2, M2, D2	**Assignment 2**: MIDI Sequencing	Brief to create a sequenced performance in music software, from a piece of notated music.	Portfolio of evidence to include: • recorded pieces • screenshots (where applicable) • project report • tutor observation records.
P3, M3, D3	**Assignment 3**: Cover Version	Brief from a production company to produce a cover version of a given piece.	Portfolio of evidence to include: • recorded pieces • screenshots (where applicable) • project report • tutor observation records.
P4, M4, D4	**Assignment 4**: Original Piece	Brief to create an effective demo of an original composition created and mastered using contemporary techniques.	Portfolio of evidence to include: • stereo audio master • screen shots (where applicable) • project report • tutor observation records.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Art and Design suite. This unit has particular links with the following units in the BTEC Art and Design suite:

Level 2	Level 3
Working with Moving Image Briefs	2D Animation

There are opportunities to relate the work done for this unit to Skillset National Occupational Standards in Sound as follows:

- S14 Mix recorded sound
- S20 Edit sound.

Essential resources

For MIDI-based work, a computer-based sequencing software package will be required, but learners will also need to be introduced to dedicated pieces of equipment which they may be required to use in work situations and in conjunction with live performance. A variety of sound sources will be required and learners should have facilities to record completed work onto disc or other formats for playback purposes. These should include portable recording equipment, different types of microphones and stands, non-linear recording and editing facilities of an industry standard.

Learners should have access to a recording studio, properly structured for learning purposes with a good listening environment and professional-standard monitoring equipment. 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. The library should hold copies of up-to-date books on sound recording, as well as relevant industry journals. Learners should have access to a variety of recorded and printed materials for research and to use as models for composing and producing CD covers.

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 production and composition.

Skillset, the Sector Skills Council for the creative media sector, has a substantial section of its website dedicated to careers, including job descriptions – www.skillset.org/careers and www.skillset.org/interactive/overview.

Further general information on work-related learning can be found at the following websites:

- www.aimhighersw.ac.uk/wbl.htm – work-based learning guidance
- www.businesslink.gov.uk – local, regional business links
- www.nebpn.org – National Education and Business Partnership Network
- www.vocationallearning.org.uk – Learning and Skills Network
- www.warwick.ac.uk/wie/cei – Centre for Education and Industry, University of Warwick – work experience and workplace learning frameworks.

Indicative reading for learners

Textbooks

Baylis P, Freedman A, Procter N et al – *BTEC Level 3 National Creative Media Production, Student Book* (Pearson, 2010) ISBN 978-1846906725

Baylis P, Freedman A, Procter N et al – *BTEC Level 3 National Creative Media Production, Teaching Resource Pack* (Pearson, 2010) ISBN 978-1846907371

Gurevitz S – *Music Technology Workbook* (Elsevier, 2005) ISBN 978-0240519701

Huber D – *The MIDI Manual* (Elsevier, 1998) ISBN 978-0080479460

Penfold R A – *Computers and Music* (Cimino, 1992) ISBN 978-1870775325

Rumsey F J – *MIDI Systems and Control* (Focal Press, 1994) ISBN 978-0240516125

Journals

Audio Media

Future Music

Music Technology

Sound on Sound

Websites

www.emusician.com – *Electronic Musician* magazine

www.soundonsound.com – *Sound on Sound* magazine

www.synthzone.com – links to sites related to sound and vision

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 ...
Creative thinkers	generating ideas and exploring possibilities when creating and producing musical performances
Self-managers	organising time and resources, prioritising actions when working independently on musical pieces.

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 ...
Independent enquirers	identifying questions to answer and problems to solve when assessing new and current production techniques and researching technology updates
Reflective learners	inviting feedback and dealing positively with praise, setback and criticism from peer group with regard to music projects.

Functional Skills – Level 2

Skill	When learners are ...
ICT – Use ICT systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using computer workstations when recording
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	using computer workstations when recording
Manage information storage to enable efficient retrieval	saving and backing up production projects
Follow and understand the need for safety and security practices	operating computer workstations when recording
ICT – Find and select information	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	researching software and technology updates.