OCR
Oxford Cambridge and RSA

Cambridge **TECHNICALS LEVEL 3**

IT

Cambridge TECHNICALS 2016

Unit 5 – Virtual and augmented reality
DELIVERY GUIDE

Version 3

CONTENTS

The activities within this teaching and learning resource must not be used for summative assessment purposes. As part of our teaching we expect support to be given to your learners; such support is not permissible for summative assessment and is likely to be considered malpractice.

INTRODUCTION

This Delivery Guide has been developed to provide practitioners with a variety of creative and practical ideas to support the delivery of this qualification. The Guide is a collection of lesson ideas with associated activities, which you may find helpful as you plan your lessons.

OCR has collaborated with current practitioners to ensure that the ideas put forward in this Delivery Guide are practical, realistic and dynamic. The Guide is structured by learning outcome so you can see how each activity helps you cover the requirements of this unit.

We appreciate that practitioners are knowledgeable in relation to what works for them and their learners. Therefore, the resources we have produced should not restrict or impact on practitioners' creativity to deliver excellent learning opportunities.

Whether you are an experienced practitioner or new to the sector, we hope you find something in this guide which will help you to deliver excellent learning opportunities.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resources.feedback@ocr.org.uk.

OPPORTUNITIES FOR ENGLISH AND MATHS SKILLS DEVELOPMENT AND WORK EXPERIENCE

We believe that being able to make good progress in English and maths is essential to learners in both of these contexts and on a range of learning programmes. To help you enable your learners to progress in these subjects, we have signposted opportunities for English and maths skills practice within this resource. We have also identified any potential work experience opportunities within the activities. These suggestions are for guidance only. They are not designed to replace your own subject knowledge and expertise in deciding what is most appropriate for your learners.

English   123 Maths   Work

Please note

The timings for the suggested activities in this Delivery Guide **DO NOT** relate to the Guided Learning Hours (GLHs) for each unit.

Assessment guidance can be found within the Unit document available from www.ocr.org.uk.

The latest version of this Delivery Guide can be downloaded from the OCR website.

UNIT AIM

Virtual reality is a simulated environment that is intended to replicate the physical experience of being in places in the real or imagined worlds by giving the user sensory experiences that match those which would be experienced were the user actually in that environment. Augmented reality is the process of changing the user's view of the real world in order to give them an improved, or more detailed, view of what they are seeing.

You will learn about both technologies and how they are used. You will research both technologies and design both a virtual and an augmented reality resource. Finally, you will use your research and skills learnt whilst designing and creating resources to suggest future applications for virtual and augmented reality.

This unit is mandatory to the emerging digital technology practitioner specialist pathway in the Level 3 Diploma suite of qualifications due to its relevance to emerging digital technologies. The unit supports the development of skills, knowledge and understanding relevant to a job role in the areas of 3D modelling, digital transformation and even the film and games industry.

Unit 5 Virtual and augmented reality	
LO1	Understand virtual and augmented reality and how they may be used
LO2	Be able to design virtual and augmented reality resources
LO3	Be able to create a virtual or augmented reality resource
LO4	Be able to predict future applications for virtual and augmented reality

To find out more about this qualification please go to: http://www.ocr.org.uk/qualifications/cambridge-technicals-it-level-3-certificate-extended-certificate-introductory-diploma-foundation-diploma-diploma-05838-05842-2016-suite

Cambridge TECHNICALS 2016

2016 Suite

- **New suite for first teaching September 2016**
- **Externally assessed content**
- **Eligible for Key Stage 5 performance points from 2018**
- **Designed to meet the DfE technical guidance**

RELATED ACTIVITIES

The Suggested Activities in this Delivery Guide listed below have also been related to other Cambridge Technicals in IT units/Learning Outcomes (LOs). This could help with delivery planning and enable learners to cover multiple parts of units.

This unit (Unit 5)	Title of suggested activity	Other units/LOs	
LO1	Research and report on the early history of virtual and augmented history – Part 1 and Part 2	Unit 1 Fundamentals of IT	LO1 Understand computer hardware LO2 Understand computer software
	The impact of virtual and augmented reality	Unit 2 Global information	LO1 Understand where information is held globally and how it is transmitted LO3 Understand the styles, classification and the management of global information
		Unit 3 Cyber security	LO1 Understand what is meant by cyber security LO2 Understand the issues surrounding cyber security
LO2	Design task	Unit 6 Application design	LO1 Understand how applications are designed LO2 Be able to investigate potential solutions for application developments LO3 Be able to generate designs for application solutions LO4 Be able to present application solutions to meet client and user requirements
		Unit 15 Games design and prototyping	LO1 Understand the principles of game design and prototyping LO2 Be able to develop game concepts LO3 Be able to develop game prototypes LO4 Be able to present and evaluate game concepts
		Unit 21 Web design and prototyping	LO2 Be able to plan the development of an interactive website for an identified client
LO3	Use a client brief to identify how client needs will be met	Unit 6 Application design	LO2 Be able to investigate potential solutions for application developments
		Unit 14 Software engineering for business	LO2 Be able to investigate business requirements for programming solutions
		Unit 21 Web design and prototyping	LO2 Be able to plan the development of an interactive website for an identified client
	Develop a virtual or augmented reality product to a set brief	Unit 6 Application design	LO1 Understand how applications are designed LO2 Be able to investigate potential solutions for application developments LO3 Be able to generate designs for application solutions LO4 Be able to present application solutions to meet client and user requirements
		Unit 9 Product development	LO3 Be able to implement and test products
	Create a test plan for end user testing	Unit 9 Product development	LO4 Be able to carry out acceptance testing with clients
		Unit 15 Games design and prototyping	LO3 Be able to develop game prototypes
		Unit 21 Web design and prototyping	LO3 Be able to create prototype websites for an identified client
	Review the completed product against success criteria	Unit 9 Product development	LO4 Be able to carry out acceptance testing with clients

KEY TERMS

Explanations of the key terms used within this unit, in the context of this unit	
Key term	**Explanation**
Augmented reality	The process of manipulating reality as seen by a user.
Design specifications	A document that describes the type and nature of the product to be created and gives enough information for the success criteria to be identified.
Equipment	The tools and machinery used to complete a project.
Haptic devices	Devices which simulate touch.
Materials	The consumables that create your product e.g. photocopying paper or cardboard for making a mock-up of your virtual reality product.
Person hours	One person hour is the work one person can do in one hour. A job that requires five person hours can be done by five people in one hour, by one person in five hours, or somewhere between the two.
Repurposing	Taking something that is developed for one purpose and identifying another potential use within, or outside of the same sector.
Success criteria	A list of things that must be achieved by a project if it is to be considered a success.
Terms of reference	A description of what a project is for and the form the final product should take.
Trigger	The item which marks the start of an event. An example would be a trigger image, which is the image that, when accessed, starts an augmented reality product.
Virtual reality	The process of creating a virtual world into which the user or experiencer is thrown.
WYSIWYG	What you see is what you get. A visual method of creating a product by adding elements so that the position of the elements and how they react is determined visually and not by direct coding.

MISCONCEPTIONS

Some common misconceptions and guidance on how they could be overcome		
What is the misconception?	**How can this be overcome?**	**Resources which could help**
Virtual and augmented reality products are the same	Learners should be encouraged to explore a range of different uses of virtual and augmented reality and to then identify the differences between the two technologies.	Total immersion Top 10 Augmented Reality Use Cases http://www.t-immersion.com/augmented-reality/use-cases The site looks at examples of augmented reality in use.
The software and hardware required to run VR and AR are expensive	This is covered in the tasks, but research into products such as Google Cardboard (VR) and Aurasma (AR) will provide evidence of relatively low cost solutions. Aurasma is now known as HP Reveal and can be downloaded using the link provided. OCR provide suggestion on using software and hardware applications and will not be able to provide any support for these. There are many other hardware and software available for you to choose from.	Google Cardboard http://www.google.com/get/cardboard/ Aurasma/HP Reveal https://www.hpreveal.com/
High quality graphics are required for virtual reality	Allow learners to read a comic or similar resource. Despite the relatively low quality graphics, the learner will become involved with the story.	
Virtual reality is only used in gaming	Virtual reality can apply to many different areas of technology. Research conducted for Learning Outcome 1 should clarify this misconception.	
Augmented reality is a brand new technology	Augmented reality has been around since at least the mid-1990s. Allowing the learners to research into the subject should address this.	
Augmented reality overlays may only be text or images	Overlays may be text or images, but may also include other media, such as web pages. Allowing learners to explore augmented reality products that include web pages should address this issue.	
Augmented reality requires special hardware	Augmented reality can be used on smartphones. Access to augmented reality created on apps such as Aurasma/HP Reveal will allow learners to explore augmented reality on, for example, smartphones and iPads.	Aurasma/HP Reveal https://www.hpreveal.com/

SUGGESTED ACTIVITIES

LO No:	1		
LO Title:	**Understand virtual and augmented reality and how they may be used**		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
Research and report on the early history of virtual and augmented history – Part 1	Tutors could introduce learners to the list of pioneers in the Teaching Content. Learners could then carry out further research into these pioneers of virtual and augmented reality. Learners could then create a presentation on the particular contribution made by each person researched. This could be presented to the group. Information may be found at: http://history-computer.com/ModernComputer/Software/Sketchpad.html	1 hour	Unit 1 LO1, LO2
Research and report on the early history of virtual and augmented history – Part 2	This task is an extension to the work completed in the activity above. Learners could continue their research into the pioneers of virtual and augmented reality and focus on the work of one further person not mentioned in the Teaching Content. Learners could then create a presentation or recorded piece (in the form of a radio news report) on the work of their chosen pioneer.	50 minutes	Unit 1 LO1, LO2
Uses of virtual and augmented reality	Learners could research the benefits of virtual and augmented reality across a range of areas. The research could focus on those areas listed in the Teaching Content as a minimum, but could also expand to include other areas of current use. Learners could report on: • The item itself (physical description, features) • The impact of the item in its field of use. http://scramboo.com/the-impact-of-augmented-reality-on-retail	40 minutes	

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Use of virtual and augmented reality in context	Learners could choose one area from the list in the Teaching Content. Learners could research, and then create an in-depth presentation on, the use of virtual or augmented reality in their chosen area of focus. Learners could present their findings to the group.	30 minutes plus presentations	
The impact of virtual and augmented reality	Learners could be asked to review the impact of the two technologies on those who have used them or benefited from their use. The outcomes could be presented in the form of a news article, suitable for submission to a magazine. This may be completed as an extension of the magazine activity completed above.	50 minutes	Unit 2 LO1, LO3 Unit 3 LO1, LO2
Virtual and augmented reality – what next?	This activity may be considered as a continuation of the activity above. Learners could speculate on possible future developments of virtual or augmented reality. Learners should identify at least three different areas where their chosen technology may be developed further. Learners could focus on areas where their chosen technology has yet to have a significant impact. Learners could explain how their chosen technology could be used and the impact it would have, as well as discuss the feasibility of their suggestion. The following resources will need to be regularly checked and learners will need to search the sites for augmented and virtual reality, as new developments are made possible: http://www.marxentlabs.com/5-top-virtual-reality-augmented-reality-trends-2016/ http://www.forbes.com/forbes/welcome/	30 minutes	

SUGGESTED ACTIVITIES

LO No:	2
LO Title:	Be able to design virtual and augmented reality resources

Title of suggested activity	Suggested activities	Suggested timings	Also related to
The use of hardware in virtual and augmented reality	Learners could research each type of hardware listed in the Teaching Content. From their research they should be able to: • Describe each type of hardware, including features • Compare how each item of hardware is used with virtual and augmented reality. Learners could then produce a presentation focussing on the use of each type of hardware listed. The following resources will need to be revisited regularly and will add to the learners' understanding of hardware possibilities: https://www.networkworld.com/article/3174804/mobile-wireless/the-3-biggest-challenges-facing-augmented-reality.html http://ieeexplore.ieee.org/document/7833028/ https://www.marxentlabs.com/virtual-augmented-reality-trends-2017/ https://www.computerworld.com/article/3181294/emerging-technology/augmented-and-virtual-reality-to-see-aggressive-growth-by-2021.html http://www.modsimworld.org/papers/2017/Navigating_AR_and_VR_Hardware_Choices.pdf	40 minutes	
The use of sensors in virtual and augmented reality	Learners could focus on the use and impact of sensors in relation to virtual and augmented reality. They could research the range of types of sensors that may be used with virtual and augmented reality products and produce a report on each type and how it has allowed virtual and augmented reality to develop in particular ways. For example, learners may focus on the use of optical sensors in the field of augmented reality. Where possible, learners should support their work with real-world examples.	50 minutes	
The use of software in virtual and augmented reality	Learners could research software that may be used to create and display virtual and augmented reality products. This research could allow learners to compare the different titles available, with particular focus on their features and impacts. The results of learners' research could be presented as a table. Learners could then produce a presentation focussing on the use of each type of software listed.	40 minutes	

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Research into low cost solutions that may be used to create virtual or augmented reality products	This task allows learners to compare features and usage of products to their initial cost of purchase. Learners may carry out specific research into low cost technology solutions that may be used to create virtual and augmented reality products. Learners could be encouraged to carry out their own research and to discuss and compare their findings with others in the group. The outcome of this research should be a clear understanding of the resources available both online and within the centre, so that learners are able to make an informed decision about the software and hardware to be used to create their virtual or augmented reality products.	40 minutes	
Compare the features and possible uses of virtual and augmented reality	This task is intended to allow learners to make an informed decision about how their work will proceed throughout the remainder of this Unit. This activity continues on from the research and discussion completed as part of the activity above. Learners could create a mind map or Venn diagram of the features and possible uses of virtual and augmented reality. The outcome of this task could be used to aid the process of deciding on the area of focus for Learning Outcome 3. The following resource will need to be regularly checked and will add to learners' understanding of hardware possibilities: http://www.goldmansachs.com/our-thinking/pages/technology-driving-innovation-folder/virtual-and-augmented-reality/report.pdf	30 minutes	
Design task	Tutors could review the use of design techniques such as: • Identification of success criteria • Creating a storyboard • Creating a timeline • Creating a mood board • Effectiveness and ease of use of financial plans. Learners could design a sample virtual or augmented reality product using the design techniques listed above. Tutors will find the following link useful as it shows how to create an interactive augmented reality product using blippbuilder from blippar. The clip has been produced by a teacher of the Cambridge Technicals in IT in preparation for the 2016 specifications. During the video, he informs teachers that blippar has confirmed that its software is available for free use for education establishments such as schools and colleges and will continue to be so. https://www.youtube.com/watch?v=x2td0r8ULaA	50 minutes	Unit 6 LO1, LO2, LO3, LO4 Unit 15 LO1, LO2, LO3, LO4 Unit 21 LO2

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SUGGESTED ACTIVITIES

LO No:	3		
LO Title:	**Be able to create a virtual or augmented reality resource**		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
Use a client brief to identify how client needs will be met	Whilst learners will complete a virtual or an augmented reality product for their actual submission, the option to consider one of each at this stage as part of their research could prove beneficial. Tutors could provide learners with a choice of scenario-based tasks on which to develop their skills before working on the task they will complete for submission. These could be supported by design documents, including storyboards as a minimum. Learners, working in pairs, could identify the success criteria for each of the scenarios presented. Once this task is complete, learners could then compare their success criteria with others in the group. Where there are differences in the success criteria identified, this could lead to a discussion of the root of the difference and an agreement on what are the correct success criteria for the task.	1 hour	Unit 6 LO2 Unit 14 LO2 Unit 21 LO2
Develop a virtual or augmented reality product to a set brief	Learners could be presented with plans for each sample task discussed in the activity above and could choose one that they will now complete. Learners could create the following necessary parts: • Mock-ups • Trigger image • Layers or overlays. Learners could complete the task to create either a working virtual or a working augmented reality product. The following video has been produced by a teacher of the Cambridge Technicals in IT in preparation for the 2016 specifications. During the video, he informs teachers that blippar has confirmed that its software is available for free use for education establishments such as schools and colleges and will continue to be so. https://www.youtube.com/watch?v=x2td0r8ULaA	6 hours	Unit 6 LO1, LO2, LO3, LO4 Unit 9 LO3

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Create a test plan for end user testing	Tutors could introduce the concept of end user testing, as well as success criteria. These could be linked, so that learners are aware that user acceptance testing will be used to measure the success of a project. Tutors could produce a partially completed test plan for each of the tasks discussed in the Use a client brief to identify client needs will be met activity above. Each test plan should include no more than two or three tests. Learners could review the client needs criteria for their chosen brief and use this to complete the test plan for that brief. http://www.softwaretestinghelp.com/what-is-user-acceptance-testing-uat/	40 minutes	Unit 9 LO4 Unit 15 LO3 Unit 21 LO3
Review the completed product against success criteria	Learners could use their completed test plan to review the success of their product. This may be presented as a short written report. As an extension, learners could review how well their test plan assessed the coverage of the success criteria. For example, they may consider whether all aspects were covered, or if the focus of each individual test allowed the success criteria to be properly assessed. The extension task may also be presented as a short written report.	30 minutes	Unit 9 LO4
Evaluate the success of the completed practice project	Learners could review the practice task in three stages: • Design • Project management • Creation stage. Each stage of the review should concentrate on the list included in the Teaching Content, along with any other issues on which learners may wish to focus. For example, as well as considering success criteria, learners may wish to consider whether the storyboards with which they were provided were effective. The outcome from this task should be a written report on the success of the completed practice task.	1.5 hours	

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Identify improvements	Learners could be encouraged to reflect on their projects as a group. Learners may be organised into groups based on their choice of project. The focus of their reflection could be how items could be improved should this or similar projects be completed again in the future. Learners could base their reflection on any available evidence, including their test plans, and, if available, feedback from others, including the end user and/or client. The outcome of this task will be the discussion itself, but should be supported by notes made by learners in preparation for the discussion.	20 minutes	

SUGGESTED ACTIVITIES

LO No:	4		
LO Title:	Be able to predict future applications for virtual and augmented reality		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
Review of the benefits of virtual and augmented reality	A tutor-led discussion on the impacts that virtual and augmented reality have had on society as a whole. Learners could prepare for this discussion by reviewing the research they completed for Learning Outcome 1 and any other understanding of these technologies that they have gained during the course of their work on this Unit. Learners should be encouraged to take notes during the discussion. The outcome of this discussion should be a four-page pamphlet that describes the benefits gained by using these two technologies. The pamphlet could be produced either as part of a group project or individually. http://www.augment.com/blog/augmented-reality-in-business-boom-or-bane/ http://crowdcomfort.com/benefits-augemented-virtual-reality-real-estate/ http://www.vrs.org.uk/virtual-reality/how-does-it-affect-us.html	2 hours 35 minutes	
Compare current use of virtual and augmented reality with potential use of these technologies	This task builds on the work completed for Learning Outcome 1 in this Unit. Learners could use the research completed for Learning Outcome 1 as a basis from which to research into areas where virtual and augmented reality are not currently used at all, or as fully as they could be. Areas for focus include, but are not restricted to, medical, military or educational use. The research could focus on a combination of current uses of virtual and augmented reality and how these could be repurposed, as well as wholly new virtual and augmented reality products. The outcome from this activity could be a table highlighting areas where virtual and augmented reality use could be expanded.	45 minutes	
Possible developments in virtual reality	This task continues from the activity above. Learners could identify those areas from the list produced for the activity above that may be considered uses of virtual reality. Learners could then create a presentation exploring how one item on that list may be developed and the role it could play. For example, learners may focus on a new use of virtual reality within the entertainments industry or medicine and the feasibility of that use.	40 minutes	

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Possible developments in augmented reality	This task continues from the Compare current use of virtual and augmented reality with potential use of these technologies activity above. Learners could identify those areas from the list produced that may be considered uses of augmented reality. Learners could then create a presentation exploring how one item on that list may be developed and the role it could play. For example, learners may focus on a new use of augmented reality within education or travel. Learners should be encouraged to use imagination and not be restricted by current technology. There is a clear opportunity for Blue Sky thinking here.	40 minutes	
Virtual reality that could be repurposed	Learners could identify one current use of virtual reality that could be repurposed and describe the advantages that can be gained by doing so. The outcome of this task could be a group presentation or a recorded piece to camera.	40 minutes	
Augmented reality that could be repurposed	Learners could identify one current use of augmented reality that could be repurposed and describe the advantages that can be gained by doing so. The outcome of this task could be a group presentation or a recorded piece to camera.	40 minutes	

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Publication date: 26 Aug 2016
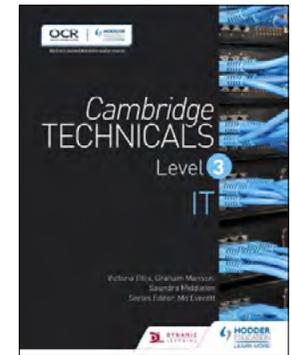
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