

## **Component 1: Exploring user interface design principles and project planning techniques**

In Component 1, Learning aim A, students will investigate the different types of user interface: textual, menu, GUI/WIMPs, speech and sensors. Students must understand the key characteristics of each of them and how they can support different user needs. Students will also investigate the different design principles and how these can be used to ensure effective user interface design. Students will investigate the different types of user accessibility needs, skill levels and demographics and the methods that can be used to create a user interface that is suitable for all users.

Learning aim B introduces students to a range of different project planning tools and why they may be used. Students must be able to select the most suitable project planning tools for a given project brief and then be able to plan and design a user interface for a set of given project requirements. Students are then required to draw on their knowledge of different design principles from Learning aim A to create a design specification for a user interface.

In Learning aim C, students are required to create a user interface to meet a set of project requirements. They will then learn how to obtain effective feedback and refine their user interface. Students will then review the strengths and weaknesses of their user interface and the project planning techniques used.

Students will be taught all the skills first before they will have a set amount of time to complete the official assignment that will be marked and go towards their final grade. Students will also get a chance to resubmit assignments but they will only be given 1 week to complete the improvements.

<b>Component title</b>	Component 1: Exploring user interface design principles and project planning techniques
<b>Guided learning hours</b>	36
<b>Number of lessons</b>	36
<b>Duration of lessons</b>	1 hour

Lesson	Topic from specification	Suggested activities	Classroom resources
<b>Learning aim A: Investigate user interface design for individuals and organisations</b>			
1	Introduction to user interfaces  [Component 1, A1, Definition of user interface, Range of uses]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>• Students are introduced to the term 'user interface'.</li> <li>• Students work in pairs to discuss and identify the tasks that a shop assistant may want to complete using an electronic till and the tasks an individual may want to complete using a self-service ticket machine.</li> <li>• Teacher introduces Component 1 and explains that students will learn about the different types of user interface, the different design principles that can be used to design effective user interfaces and apply project planning techniques to create a user interface.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>• Students are introduced to the different features, including human features, software features and how they facilitate users.</li> <li>• Students think of example uses of user interfaces, including: computers, handheld devices, entertainment systems, domestic appliances, controlling devices and embedded systems.</li> <li>• In pairs, students discuss experience using different devices with different user interfaces.</li> <li>• Students compare ideas and experiences of tasks they have undertaken on different devices, considering the methods used and how successful they were.</li> <li>• Students work in pairs to name other devices that have a user interface.</li> </ul> <p><b>Plenary activity</b></p>	<p>Devices for students to investigate or images of different devices for students to discuss, such as a laptop, tablet computer, home assistant or other household devices.</p> <p>Access to the internet.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> <li>Students confirm their understanding of 'user interface', giving features of – and example interactions with – a user interface.</li> </ul>	
2	Basic user interfaces  [Component 1, A1, Types of interface]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to the idea of a textual interface.</li> <li>Students work individually to memorise a short list of commands that could be used within a textual interface, e.g. ls, (list contents of directory and files), cd (change directory), mkdir (create new directory), grep (search text), chmod (change mode), passwd (change password), symlink (symbolic link).</li> <li>Students spend 20 seconds looking at the commands and then write out as many commands as they can remember.</li> <li>Students discuss how they found the task and how successful they were. They consider the implications of having hundreds of commands to remember.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to text-, form- and menu-based user interfaces, the key characteristics of each and when they would be used.</li> <li>In pairs, students research different examples of text-, form- and menu-based user interfaces and explain their suitability for the tasks they are being used for.</li> <li>Students give four example uses for each type of user interface.</li> <li>Students give benefits and drawbacks for each type of user interface.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>Students work with a partner to discuss which type of interface may be used on a smartwatch and justify their choice.</li> </ul>	Images showing examples of different text-, form- and menu-based user interfaces.  Access to the internet.  Word-processing software for students to record their findings.
3	Complex user interfaces  [Component 1, A1, Types of interface]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to the concept of 'trial and error' and how user interfaces should allow users to use this approach when completing new tasks for the first time.</li> <li>Teacher introduces a specific task for students to complete using a device. This could be to find a certain program/file or to change a specific setting.</li> <li>Students assess how they achieved this and the strategy used to complete the task.</li> </ul>	Images showing examples of different graphical-, sensor- and speech-based user interfaces.  Access to the internet.

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		<ul style="list-style-type: none"> <li>Students discuss how this may have been different if a text-, form- or menu-based user interface was used (referring back to the previous lesson).</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to graphical-, sensor- and speech-based user interfaces, the key characteristics of each and when they would be used.</li> <li>In pairs, students research different examples of graphical-, sensor- and speech-based user interfaces and explain their suitability for the tasks they are being used for.</li> <li>Students give four example uses for each type of user interface.</li> <li>Students give benefits and drawbacks for each type of user interface.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>Students describe two ways in which supermarket self-checkouts could make use of graphical-, sensor- and speech-based interfaces.</li> </ul>	<p>Word-processing software for students to record their findings.</p>
4	<p>Choosing a user interface</p> <p>[Component 1, A1, Factors affecting the choice of user interface]</p>	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Students visit an app store on their device to search for a GCSE Maths revision app for use on a smartphone.</li> <li>Students decide which app they would use based on the app's reviews and justify reasons for their decision.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students work in groups to discuss factors that need consideration before choosing a user interface and share their ideas with the class. This should include: performance, user requirements, ease of use, user experience, accessibility and storage space.</li> <li>Students work in groups to decide and justify the four most important factors to consider when choosing a user interface for a doctor's surgery.</li> <li>Students continue to work in groups and think of a different scenario that requires a new user interface. They must decide and justify the four most important factors to consider when choosing a user interface for the company.</li> <li>Students reflect on how and why these are different to the doctor's surgery.</li> </ul> <p><b>Plenary activity</b></p>	<p>If possible, a selection of tablet devices with some Maths revision apps already installed for students to use.</p> <p>Access to the internet with access to visit app stores.</p> <p>If a policy or firewall is in place that restricts students using their own devices or visiting an app store, then students can be given screenshots of different reviews to read instead.</p>

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		<ul style="list-style-type: none"> <li>Using the information they have gathered from their discussions in the main activity, students rank all the factors in order from the highest to lowest priority.</li> </ul>	
5	<p>How hardware and software affect user interfaces</p> <p>[Component 1, A1, Hardware and software influences]</p>	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>Students consider their experience of using the same website on two different devices or platforms and how the user interface and features differ on each.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students research the hardware and software available on a desktop computer, mobile phone and a digital watch of their choice and use word-processing software to record their findings. Students may want to create a table with the following headings: operating system, size of screen, type of screen, method of user input, processing power and amount of RAM.</li> <li>In pairs, students discuss how the hardware and software differs between the three devices.</li> <li>In pairs, students discuss how the hardware and software available on each device will impact on the type and design of the user interface.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>Students are given specific information about a device's components and must consider how these components impact the user interface.</li> </ul>	<p>Two different devices (e.g. desktop and mobile phone or tablet). If it is not possible for students to use two different devices, then students can be given screenshots of the same user interface on two different devices.</p> <p>Access to the internet.</p> <p>Word-processing software for students to record their findings.</p>
6	<p>User accessibility needs</p> <p>[Component 1, A2, Accessibility needs]</p>	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>Students are introduced to the word 'accessibility' and what it means.</li> <li>Students work alone to consider the accessibility options that are commonly found in smartphones and computers. They make a list of available options and why a user may choose them.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students research the meaning of inclusion.</li> <li>In pairs, students discuss how a user might feel if they have a specific need and are unable to access all areas of a user interface.</li> <li>In pairs, students research and consider how user interfaces can be adapted to support different needs. This includes: visual needs, hearing needs, speech needs, motor needs and cognitive needs.</li> </ul>	<p>Access to the internet.</p> <p>Different application software that contains different accessibility features for students to explore.</p> <p>Word-processing software for students to record their findings.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> <li>● In pairs, students select two programs that serve different purposes. They annotate screenshots to show how accessible features could be used to help users with specific needs.</li> <li>● Students discuss how they could further develop accessibility features to better support users.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>● Students consider how a user interface for a local college application form can be adapted for users with visual, hearing and speech accessibility needs.</li> </ul>	
7	<p>User skills and demographics</p> <p>[Component 1, A2, Skill level, Demographics]</p>	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>● Students to understand what a 'skill' is and that different people have different skills.</li> <li>● Students to consider the range of digital skills in their own families and how different age groups use devices.</li> <li>● With a partner, students think about what advice they would give to a developer to help them design a user interface for people with limited digital skills.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to the terms 'expert', 'regular', 'occasional' and 'novice' user.</li> <li>● Students to think of example skills that each type of user would have and justify their reasons.</li> <li>● Students to research different jobs that would require a person to have expert, regular, occasional and novice computer skills.</li> <li>● Students are introduced to the different user demographics, including: age, past experiences, beliefs/values and culture.</li> <li>● Students to consider a program that is aimed at children aged 4–6 and teenagers aged 13–15. The program should encourage young people to lead a healthier and active lifestyle.</li> <li>● With a partner, students consider what experiences they think children and teenagers will have of using different devices.</li> <li>● Still in pairs, students discuss how these different experiences will impact on the design of the user interface.</li> </ul> <p><b>Plenary activity</b></p>	<p>Access to the internet to research different jobs that require different levels of IT skills, e.g. journalist, receptionist, police officer, personal trainer, engineer, hospital nurse, business administrator.</p> <p>Word-processing software for students to record their findings.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> <li>Students are given different devices and programs and then are asked to categorise themselves as expert, regular, occasional or novice users. Students explain their decisions to a partner.</li> </ul>	
8	Design principles: visual elements [Component 1, A3, Colour, Font style/size]	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>Students review the centre's correspondence documents and website to identify elements of branding and visual identity.</li> <li>Students should consider the elements that are the same across all correspondence and what the benefits of this are.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to how they can make effective use of colour, including: using limited colours and organisational colours, ensuring colours don't clash and using textures.</li> <li>Students are introduced to how they can make effective use of font styles and sizes, including: use of appropriate font types, avoiding decorative fonts and ensuring the font style and font size are readable.</li> <li>In pairs, students consider how colour, text size and style are used effectively when designing a student interface. Students may want to refer to different user interfaces that they have used previously.</li> <li>In pairs, students find examples of user interfaces that effectively use these elements and those that use them less effectively. Students could take a screenshot of each user interface then annotate them to show how it has made effective or ineffective use of visual elements.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>Students write a list of dos and don'ts when using colours and fonts in a user interface.</li> </ul>	Examples of centre's logo, stationery and other documents (e.g. website, newsletter, centre uniform, etc.).  Access to the internet to look at different images of different user interfaces that make effective and ineffective use of visual elements.  Word-processing software for students to record their findings.
9	Design principles: text elements  [Component 1, A3, Language, Amount of information]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Give students 20 words to try to remember in 1 minute. Students write down as many as they can remember.</li> <li>As a class, discuss the strategies students used to remember the words.</li> <li>Students understand that the amount of information that humans can handle at any particular time is limited.</li> </ul> <p><b>Main session activities</b></p>	List of 20 words for students to remember in introductory activity.  Access to email software.

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		<ul style="list-style-type: none"> <li>● Students are introduced to how they can make effective use of language, including: making sure the language is appropriate to user needs/skill levels, using appropriate information for the task and linking the amount of information to the available whitespace.</li> <li>● Students imagine they are supporting a novice user with little computer experience.</li> <li>● Students write down the instructions in an ordered list that will help the user send an email.</li> <li>● In pairs, students discuss how they found writing instructions for novice users.</li> <li>● Students select a program of their choice. In the help menu they read a tutorial for a tool that they have never used before and try to follow it.</li> <li>● Students discuss with a partner how they found the task and how effective the amount and language of the text in the tutorial was.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>● Students write a list of dos and don'ts for using text in a user interface.</li> </ul>	<p>Access to different application software that contains suitable help menus and tutorials for students to follow and evaluate.</p> <p>Word-processing software for students to record their findings.</p>
10	<p>Design principles: layout</p> <p>[Component 1, A3, Layout]</p>	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>● Students to understand what is meant by the term 'layout'.</li> <li>● Students think of a program, app or website that they use regularly and without looking at it, sketch the layout of one of the pages.</li> <li>● Students compare their sketch with the actual program, app or website and consider how accurate they were in recreating the design and justify their reasons.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to making effective use of layout, including: consistency throughout the user interface, placement of items in obvious areas, matching users' expectations, grouping related items, use of navigational components and use of input controls.</li> <li>● Students choose a program or website and take three screenshots of different screens, annotating each screenshot to show how effective use of layout has been made.</li> <li>● Annotations should include which items and features are the same across all screens, where they feel the screens could have made more effective use of layout, how well items are placed in prominent positions, how well the navigational components are used to allow the user to easily move around different screens and where input controls have been used and how effective they are.</li> </ul>	<p>Access to the internet or device to access a user interface that contains at least three different screens, e.g. a local leisure centre website.</p> <p>Word-processing software for students to record their findings.</p>

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		<p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>In pairs, students discuss why the layout of items on a user interface is important. What factors influence the layout of items on the screen?</li> </ul>	
11	<p>Design principles: user expectations</p> <p>[Component 1, A3, User perceptions]</p>	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>Ask students to visualise giving a tablet computer to a toddler and consider how the toddler might react and what they are likely to do.</li> <li>Students to discuss a situation when they have tried to complete a task on a computer but were unable to complete it successfully. Students to discuss how this made them feel.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students to think of what immediately comes into their mind when they hear positive high-pitched sounds and negative low-pitched sounds.</li> <li>Give students an example of audio that may sound when a file is deleted. Students to discuss their immediate reaction to the sound.</li> <li>Students to think of three other situations of when a positive high-pitched sound and sharp negative low-pitched sound may be played while using devices.</li> <li>Students to think of what immediately comes into their mind when they see the colours red, amber and green.</li> <li>Students to think of what immediately comes into their mind when they see ticks and crosses.</li> <li>Ask students to imagine they want to change their password. Give an example of a green tick appearing on the screen to confirm that the password meets the password complexity rules.</li> <li>In pairs, students think of three other situations when green and red may be used to indicate that something has been successful or unsuccessful on the screen.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>Students share their answers to the main activities with the rest of the class and discuss any similarities and reasons for similar responses.</li> </ul>	<p>Search YouTube for video '9 Month Old Baby Using iPad'.</p> <p>Search YouTube for video 'A 2.5 Year-Old Has A First Encounter with An iPad'.</p> <p>Example sounds that devices play to confirm a successful user interaction or when an error has occurred.</p>

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12	<p>Design principles: keeping the user engaged</p> <p>[Component 1, A3, Retaining user attention]</p>	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>Students to think of a lesson or part of a lesson where they lost their attention. Students consider what factors contributed to this.</li> <li>Students to consider the implications of users losing their attention while using a user interface.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to the different tools and features that can be used to keep the user engaged, such as: methods to grab attention, use of uncluttered screens, use of tip text, use of labels, use of default values and use of autofill.</li> <li>In pairs, students familiarise themselves with a program or website. Students should focus on one tool or feature that their partner has not used before.</li> <li>Students learn how to use the tool or feature, and then ask their partner to use it without any help.</li> <li>Students observe their partner completing the task. Their partner should say what they are thinking at each stage and then make notes on how they found the task. Students should record how their partner completed the task or if they lost their attention on the task and why.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>Students list three methods that can be used to sustain the attention of a user while they are using a user interface.</li> </ul>	<p>Access to application software or the internet.</p> <p>Word-processing software for students to record their findings.</p>
13	<p>Design principles: intuitive design</p> <p>[Component 1, A3, Intuitive design]</p>	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>Students to be introduced to the meaning of the word 'intuitive'.</li> <li>Students list five computer skills they have learned and can now use without thinking about them.</li> <li>Students to justify their reasons for this.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to the different tools and features that can be used to create intuitive user interface design, including: graphics to denote what buttons do, helpful pop-up messages, help features, consistency and easy reversal of actions.</li> </ul>	<p>Access to the internet to allow students to undertake research.</p> <p>Productivity software that contains multiple programs within the same suite with similar user interface features (Microsoft® Office etc.)</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> <li>● In pairs, students choose some productivity software available to them and look at the user interface within the different programs to assess what features are the same and different across all programs.</li> <li>● In pairs, students investigate a program within the suite that they have not used before. They should consider if they would be able to work out how to use the program based on their knowledge of the other programs they have used. Students explain their answers.</li> <li>● Students open word-processing software and look at the images used for the following tools: copy, paste, print, spelling and grammar. Students give reasons why they think these graphics have been used and assess how effective they are.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>● Students confirm their understanding about what the word 'intuitive' means.</li> <li>● Students explain how to achieve an intuitive design and why intuitive design is important in a user interface.</li> </ul>	
14	<p>Improving the speed of user interfaces</p> <p>[Component 1, A4, Designing an effective user interface]</p>	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>● Students think of an app, website or program they have used that has run slowly and consider how it made them feel – angry, frustrated etc. Students should discuss why they felt this way.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to the different tools and features that can be used to improve the speed of user interfaces, including: use of keyboard shortcuts, reversal of actions, informative feedback and distinguishable objects.</li> <li>● In pairs, students research five different keyboard shortcuts for either a Windows PC or Apple Mac computer. For each shortcut, they say what the shortcut is and what it does.</li> <li>● Students visit a website where they could purchase products and place some items in their shopping basket. If school policy does not allow this activity, teacher could demonstrate this on the interactive whiteboard for the whole class to observe and discuss together.</li> <li>● Students try to change the options of the items they have selected and try deleting the items from their shopping basket. <b>STUDENTS SHOULD NOT ENTER ANY PAYMENT DETAILS.</b></li> <li>● Students discuss how easy it was to make changes and explain their reasons to the class.</li> </ul>	<p>Access to the internet.</p> <p>Word-processing software for students to record their findings.</p>

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		<ul style="list-style-type: none"> <li>Students screenshot the website and paste it into word-processing software. They annotate the screenshot to show which areas provide information, which areas allow the user to carry out an action and which areas allow data to be entered.</li> </ul> <p><b>Plenary activity</b></p> <ul style="list-style-type: none"> <li>Students discuss what design features could be used to help users interact with an interface more efficiently.</li> </ul>	
15	<p>Reducing the user selection time</p> <p>[Component 1, A4, Designing an effective user interface]</p>	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>Students throw a dice on to an A4 sheet of paper placed on the floor. Then reduce the size of the paper by half and throw the dice again until it lands on the paper. They keep repeating this process and assess what happens as the size of the paper gets smaller, i.e. that the size of objects directly affects accuracy and user interaction time.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are informed of the different factors that influence user interaction time: time to think about which option to select, time to move your cursor to the object, time to select the object and then time for the user interface to respond.</li> <li>Students are introduced to the different tools and features that can be used to improve the access of user interfaces, including: appropriate object sizes, object emphasis and grouping related objects.</li> <li>Students go to a website they use often and set the zoom setting to 150% and navigate around the website by clicking on the different buttons. Then set the zoom setting to 100%, 50% and 25%. As the objects get smaller, students assess how their experience of using the website changes, with the focus on how their interaction speed changes.</li> <li>In pairs, students decide how they would group the following tools in word-processing software into related areas, naming them and justifying the selection for each area: Find, Copy, Blank page, Grammar check, Chart, Shapes, Paste, Clip art, Page borders, Header, Page orientation, Spell check, Footer, Margins, Word art, Replace and Page size.</li> <li>In pairs, students think of other tools that they could put in each area.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>Students list the factors that influence the amount of time it takes for each interaction between the user and a device.</li> </ul>	<p>Dice.</p> <p>A4 paper.</p> <p>Access to the internet.</p> <p>Web browser/alternative software to allow students to change the zoom settings from 200% to 25%.</p>

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		<ul style="list-style-type: none"> <li>Students write down three methods that can be used to reduce selection times.</li> </ul>	
16	Preparation for assessment: recap of Learning aim A	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Teacher recaps topics covered in Learning aim A.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students practise for assessment independently, using suggested activities below.</li> <li><b>Suggested activity 1:</b> choose two different types of user interface. For each of their chosen user interfaces, students identify where different design principles have been used, assess how the different design principles improve the effectiveness of the user interface for its users, assess the positive and negative effects that each design principle has and assess how each design principle supports the user to efficiently use the interface.</li> <li><b>Suggested activity 2:</b> for each of their chosen user interfaces above, students describe how intuitive the user interface is and how it could be developed further to better meet the needs of users, assess to what extent the interfaces support users with different accessibility needs, skill levels and demographics, assess to what extent they match user perceptions and the methods that are used to sustain the users' attention, assess their suitability and describe an alternative user interface that could have been used and give clear reasons why the alternative type of user interface would better meet the user needs.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>Students to reflect on how they approached the practice activities, including areas they enjoyed and areas they found more difficult.</li> </ul>	
17	End of Learning aim A: formal assignment	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>Teacher introduces assignment brief for Learning aim A and discusses the criteria, explaining the command words used.</li> <li>Teacher leads a check on understanding of key terminology.</li> <li>Teacher reminds students that the assignment is formal and must be their own work. Once it has been submitted it cannot be revised or modified. They suggest students make notes to plan their response.</li> </ul> <p><b>Main session activity</b></p> <ul style="list-style-type: none"> <li>Students complete an assignment in class or for homework.</li> </ul>	Pearson authorised assignment brief or brief produced and verified by school



Lesson	Topic from specification	Suggested activities	Classroom resources
<b>Learning aim B: Use project planning techniques to plan and design a user interface</b>			
18	Project methodologies  [Component 1, B1, Project planning techniques]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>In pairs, students research an IT project that has failed and share their findings with the class. For example, this could be a website that had been partly developed or a large-scale system that had been partly developed and then abandoned.</li> <li>Students should then find out and discuss the reasons for this. Students should try to tease out the root of the problem. For example, rather than saying 'poor planning', students should look at the reasons why the planning was poor. For example, not planning the budget properly or not considering all client needs properly.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to what a project methodology is and the different project methodologies, including the waterfall model and iterative/agile model.</li> <li>In pairs, students discuss reasons why waterfall and iterative methodologies would be used.</li> <li>In pairs, students research the benefits and drawbacks of using each methodology and share their findings with the class.</li> <li>Working alone, students explain why a company such as a mobile phone app developer would make use of an iterative/agile methodology when creating user interfaces for their apps rather than a waterfall methodology.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>Students explain the common reasons why projects fail.</li> <li>Students give reasons why an iterative methodology would be used.</li> <li>Students give reasons why a waterfall method would be used.</li> </ul>	<p>Case studies of IT projects that have failed or been abandoned. For example, search for 'IT's biggest project failures – and what we can learn from them' on <a href="https://www.computerworld.com">https://www.computerworld.com</a>.</p> <p>Search for 'List of failed and overbudget custom software projects' on <a href="https://en.wikipedia.org">https://en.wikipedia.org</a></p> <p>Access to the internet.</p> <p>Word-processing software for students to record their findings.</p>
19	Co-ordinating project tasks  [Component 1, B1, Project planning techniques]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Students think of a project they have completed in school or at a club and consider what methods – if any – they used to plan and track the progress of tasks. Students consider how useful their plan was and if they continued to work with it.</li> <li>If students have not made use of a project plan, then students can consider why they didn't have one and the impacts of not creating one.</li> </ul>	<p>Suitable software to create Gantt charts, PERT charts and critical path diagrams. Alternatively, students may find the task easier if they draw these diagrams on paper.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to the purpose of and shown how to create Gantt charts, PERT charts and critical path diagrams.</li> <li>Students are introduced to the key terms: 'task dependency', 'task length', 'slack time' and 'critical path'.</li> <li>Provide students with the following time scales and dependencies: Task A – 1 day, no dependencies; Task B – 3 days, dependency on A; Task C – 60 days, dependency on B; Task D – 1 day, dependency on A; Task F – 2 days, dependency on C and E; Task G – 15 days, dependency on F; Task H – 40 days, dependency on E and G. Students use the data to create a Gantt chart, PERT chart and critical path diagram.</li> <li>Students continue to work in pairs to research the benefits and drawbacks of each diagram.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>Students give examples of three diagrams that can be used to plan time in a project.</li> <li>Students explain how these diagrams are different and the information they contain.</li> </ul>	<p>Access to the internet.</p>
20	<p>Basic project planning tools</p> <p>[Component 1, B1, Project planning techniques]</p>	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Students read the project brief for GameExchange123.</li> <li>Students imagine they have been asked to create a new user interface to meet the project requirements stated in the project brief.</li> <li>Students consider how they would approach the project and where they would start.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students should explore the project brief. They should read through the brief, filter out the information that is not important and then start to think about what is actually required. Students are required to use this project brief throughout the remainder of this component and therefore would benefit from having a good understanding of what is required.</li> <li>Students are introduced to basic tools that they can use to plan their project. These include task lists, graphical descriptions, written descriptions and mood boards.</li> <li>Students create their own mind map to illustrate a graphical description of the project brief.</li> </ul>	<p>Copies of GameExchange123 case study (see Appendix A).</p> <p>Access to the internet to research different mood boards. For example search on Pinterest or <a href="https://tinkerlab.com/">https://tinkerlab.com/</a></p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> <li>● In pairs, students produce a written description of the buying page requirements given in the brief. Students then discuss the benefits and drawbacks of using graphical and written descriptions for this project.</li> <li>● In pairs, students research different examples of mood boards on the internet.</li> <li>● Students discuss their initial reactions to the mood boards and what feeling they think each mood board creates.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students give examples of tools available to allow people to plan their projects.</li> <li>● Students give benefits and drawbacks for each method they have identified.</li> </ul>	
21	<p>Planning the project basics</p> <p>[Component 1, B2, Create a project plan]</p>	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>● In pairs, students choose a club they are familiar with, such as a local sports team or a club or team they are involved with in school.</li> <li>● Students describe the aims of the club and how these are achieved by the activities offered by the club.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to the terms 'project aim', 'project objective', 'project audience', 'project purpose'.</li> <li>● Students review the general objectives for GameExchange123.</li> <li>● In pairs, students write three SMART objectives for the GameExchange123 project brief.</li> <li>● In pairs, students write down the purpose of the GameExchange123 system and explain why it is being created.</li> <li>● 75% of GameExchange123 customers are aged 18 to 25. Students discuss what they would need to consider about the 18–25 age range when they are designing the user interface.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students explain what the acronym SMART stands for.</li> <li>● Students describe why it is important to consider the audience and purpose of a project before starting.</li> </ul>	<p>GameExchange123 case study (see Appendix A).</p> <p>Word-processing software for students to record their findings.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
22	Defining the project requirements  [Component 1, B2, Create a project plan]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Students imagine they are booking cinema tickets via a website. Working in pairs they discuss the difference between the input and output requirements of the imagined website. They should give examples of specific inputs they would need to enter and examples of outputs that will be displayed on the website.</li> <li>Students may benefit from accessing cinema websites on the internet to help them develop their ideas.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to the different requirements in a project, including user requirements, output requirements, input requirements and user accessibility requirements.</li> <li>Students create a list of user requirements to cover all requirements in the brief.</li> <li>Students create a list of output and input requirements to cover all interactions between the user and the device, using the brief.</li> <li>Students discuss some possible accessibility features they think could be built into the user interface.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>Students identify which requirements from a project brief are user requirements, input requirements, output requirements and accessibility requirements.</li> <li>Students explain the difference between them.</li> </ul>	GameExchange123 case study (see Appendix A).  Access to the internet to view different cinema websites.
23	Project constraints and risks  [Component 1, B2, Create a project plan]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Students think about the way they travel to school in the morning.</li> <li>Students make a list of possible factors that could influence the amount of time it takes them to travel there (e.g. possible risks that might influence them getting to school on time).</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to the terms 'constraint' and 'risk'. Students should understand the difference between each of these terms.</li> <li>Students are introduced to the different constraints in a project, including time, resources, task dependencies and security. Students should try to think of other possible constraints.</li> </ul>	GameExchange123 case study (see Appendix A).  Word-processing software for students to record their findings.

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> <li>● Students are introduced to the different risks in a project, including operational loss, financial loss and damage to an organisation’s reputation. Students should try to think of other possible risks.</li> <li>● Students should read the project brief for GameExchange123 and consider the possible project constraints in their school. They should consider the time and resources (e.g. hardware and software) available to them, as well as the security constraints in their school.</li> <li>● Students are told that GameExchange123 has roughly 500 000 users and the yearly revenue is £6.2 million.</li> <li>● In pairs, students should then discuss the possible risks the project could have for the company and devise a suitable contingency plan.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students demonstrate their understanding of the term ‘constraint’.</li> <li>● Students explain how knowledge of constraints helps when developing a contingency plan.</li> </ul>	
24	<p>Planning project timescales</p> <p>[Component 1, B2, Create a project plan]</p>	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>● Students think about what needs to be considered when planning the timescales in a project.</li> <li>● Students consider how to decide whether six weeks is enough time to complete their project for ExchangeGames123.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to the areas that should be considered when planning the project time for a project. This should include when tasks (including subtasks) will occur, key milestones and when the resources will be needed.</li> <li>● Students complete tasks in the context of the GameExchange123 project brief.</li> <li>● Students work in pairs to produce a suitable diagram, such as a Gantt chart or PERT chart, that shows how they would spend their time in this project.</li> <li>● Students’ diagrams should include: the overall timescale from the project’s start to its end; when tasks and subtasks will be completed; and the key milestones to include when reviews with the client will be carried out.</li> </ul>	<p>GameExchange123 case study (see Appendix A).</p> <p>Suitable software to create Gantt charts, PERT charts and critical path diagrams. Alternatively, students may find the task easier if they draw these diagrams on paper.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>Students demonstrate their understanding of the considerations when planning the timescales for a project.</li> <li>Students explain why it is important to plan key milestones and reviews in projects.</li> </ul>	
25	<p>What is a design specification?</p> <p>[Component 1, B3, Create an initial design]</p>	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Students are told what a design specification is.</li> <li>Students should then think of where they have created a design specification before. They should consider what they used it for and how useful it was. If they have never used one before, then students should consider who may find design specifications useful.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students introduced to the areas they should consider when creating a design specification. This includes increased user confidence and familiarity, reduced learning time and time to complete tasks, increased user attention and reduced need for specialist knowledge.</li> <li>Students complete tasks in the context of the GameExchange123 design specification.</li> <li>Students work in pairs and discuss how the requirements of the project are going to impact their design specification.</li> <li>Students discuss how they will create a design that will reduce the need for users to have specialist knowledge.</li> <li>Students are informed that GameExchange123 does not currently have a mobile phone app. Students work in pairs and discuss how this information is going to impact their design.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>Students demonstrate their understanding of a design specification.</li> <li>Students explain what they should consider when creating the various elements of the specification and why these should be considered at the design stage.</li> </ul>	<p>GameExchange123 case study (see Appendix A).</p> <p>Word-processing software for students to record their findings.</p>
26	<p>Creating sketches and storyboards</p>	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Students consider the benefits of sketching out ideas based on previous experience, for example in art and in design and technology classes. Students should consider why some people prefer to sketch out their ideas and why others don't.</li> </ul>	<p>GameExchange123 case study (see Appendix A).</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
	[Component 1, B3, Create an initial design]	<p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to different tools that they can use to design the visual aspect of a project, including sketches and storyboards.</li> <li>● Students work in pairs to create a storyboard for the GameExchange123 homepage.</li> <li>● Students should show what the screen will look like at different stages, including: what will be initially displayed to the user, what the screen will look like while the user is entering their game search criteria and what it will look like after the user has entered their search criteria.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students explain the purpose of a storyboard and storyboard features.</li> <li>● Students explain the benefits of using sketches and storyboards.</li> </ul>	<p>Different examples of sketches and storyboards.</p> <p>Suitable software to create a storyboard. Alternatively, students may find it easier to create their storyboard on paper.</p>
27	<p>Defining the hardware, software and testing strategy</p> <p>[Component 1, B3, Create an initial design]</p>	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>● Students think about which software products they are familiar with and which ones could be used to develop a user interface design. Students consider which other software products available to them in school would be better to use.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to the different technical requirements they should consider when starting a project, such as what hardware and software they are going to need.</li> <li>● Students work in pairs to select one piece of software that can be used to create smartphone apps.</li> <li>● Students research the system hardware requirements of their chosen software and what peripheral devices can be used to operate it.</li> <li>● Students give examples of how they can use each peripheral device within the software.</li> <li>● Students work in pairs and discuss the software requirements for the homepage given in the GameExchange123 project brief.</li> <li>● Students are introduced to test strategies and what they include. For example, how often testing will be carried out, how much time should be spent testing, who will be involved, what methods should be used, how errors will be fixed and when tests will be completed.</li> <li>● Students work in pairs and discuss other features that could be included in the test strategy.</li> </ul>	<p>GameExchange123 case study (see Appendix A).</p> <p>Word-processing software for students to record their findings.</p>

Lesson	Topic from specification	Suggested activities	Classroom resources
		<p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students explain how to identify the software and hardware requirements for a project.</li> <li>● Students explain the term 'test strategy'.</li> <li>● Students identify the features included in a test strategy.</li> </ul>	
28	Preparation for assessment: recap of Learning aim B	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>● Teacher recaps topics covered in Learning aim B.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students practise for assessment independently, using suggested activities below.</li> <li>● <b>Suggested activity 1:</b> students use the most appropriate project planning tools to plan the different parts of the project outlined in the project brief.</li> <li>● Students create a project plan that could be followed to create the user interface outlined in the project brief. This should include: <ul style="list-style-type: none"> <li>○ aims and objectives</li> <li>○ audience and purpose</li> <li>○ project requirements, including user, input and output requirements</li> <li>○ timescales, including key milestones</li> <li>○ risks and constraints.</li> </ul> </li> <li>● <b>Suggested activity 2:</b> students create an initial design specification for the user interface in the project brief. This should include: <ul style="list-style-type: none"> <li>○ a visualisation of the webpage</li> <li>○ hardware requirements</li> <li>○ software requirements</li> <li>○ a test strategy.</li> </ul> </li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students to reflect on how they approached the practice activities, including areas they enjoyed and areas they found more difficult. Students keep notes ready for final assessment at the end of Learning aim C.</li> </ul>	Word-processing software for students to record their findings.

Lesson	Topic from specification	Suggested activities	Classroom resources
<b>Learning aim C: Develop and review a user interface</b>			
29	Developing a functional user interface  [Component 1, C1, Developing a user interface]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>● Students think of a device that they regularly use and consider what it would be like if the device only had a user interface and didn't process any data (e.g. if the buttons didn't work, the device didn't respond to voice commands etc.).</li> <li>● Students consider what the device would and wouldn't be able to do.</li> <li>● Students then develop the understanding that they are required to develop a user interface for their assessment that does not actually process any data.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to the features of a user interface that makes it functional, including outputs, inputs and navigation methods.</li> <li>● Students work in pairs to complete the following tasks in the context of the GameExchange123 project brief.               <ul style="list-style-type: none"> <li>○ Students sketch a user interface suitable for a mobile device, based on the GameExchange123 project brief. It should show how the interface can be used to input data and how the data is outputted back to the user.</li> <li>○ Students swap their sketches with other pairs of students and feed back to each other on the appropriateness of the inputs and outputs in each design.</li> <li>○ Students discuss the appropriateness of the navigation methods in the user interface.</li> </ul> </li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students explain the features a user interface must have to make it functional.</li> <li>● Students explain why these features are essential for a user to use the interface effectively and be able to provide feedback.</li> </ul>	Copies of GameExchange123 case study (see Appendix A).  Word-processing software for students to record their findings.  Software suitable for students to create the functionality of the buying page for GameExchange123.
30	Showing the key aspects of a user interface	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>● Students to reflect back to the previous lesson and recap what a user interface must have to make it functional.</li> <li>● Students then consider what else they should do when creating their user interface. Students should think about what else the user may want to see before providing their feedback.</li> </ul>	Copies of GameExchange123 case study (see Appendix A).

Lesson	Topic from specification	Suggested activities	Classroom resources
	[Component 1, C1, Developing a user interface]	<p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to other areas that their user interface should include as stated in the specification, including showing an awareness of the intended device, showing how the project requirements have been met, showing the overall look and feel and showing the ease of use.</li> <li>● Using the sketches completed in the previous lesson, students work in pairs and discuss how the user interface shows awareness of the hardware and software found on mobile phones. Alternatively, students can do this for a different interface (e.g. one they have researched).</li> <li>● Students discuss which requirements from the GameExchange123 project brief have been fully or partially achieved. Alternatively, students can do this for a different user interface.</li> <li>● Students discuss which groups of people GameExchange123 could ask to test the user interface to test that it is easy to use. Alternatively, students can do this for a different user interface.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students give two examples of how different devices can impact the design of a user interface.</li> <li>● Students identify the techniques that can be use used to show the overall look and feel of a user interface.</li> </ul>	Word-processing software for students to record their findings.
31	Refining the user interface  [Component 1, C2, Refining the user interface]	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>● Students read the statement '<i>If a user interface follows all the design principles, then the user will be happy and have no feedback</i>', and decide if they agree or disagree.</li> <li>● Students should justify their reasons, drawing on knowledge that they have gained from the component so far.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students introduced to the iterative cycle that takes place when refining a user interface, including presenting the design to potential users, refining the interface to account for potential user feedback and then repeating these steps until the design is complete.</li> <li>● Students work in pairs and discuss why it is important to gain feedback from potential users.</li> </ul>	Copies of GameExchange123 case study (see Appendix A).  Word-processing software for students to record their findings.

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> <li>● Students discuss the benefits to the client and the project team of user feedback.</li> <li>● Students discuss the possible drawbacks of involving the client and the impacts that too much user feedback can have on the project.               <ul style="list-style-type: none"> <li>○ Students refer to the user interface sketches or researched examples used in the previous lesson. They write four specific questions they could ask users to gain feedback on its design.</li> </ul> </li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students give reasons why it is important to gain user feedback.</li> <li>● Students give reasons why it is important to gain specific feedback.</li> </ul>	
32	Reviewing the user interface  [Component 1, C3, Review]	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>● Students explain why it is important to review the user interface.</li> <li>● Students identify at which point the user interface should be reviewed and why it might not always be possible to make changes to the user interface following a review.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>● Students are introduced to the different areas of a user interface that should be reviewed, including: how well the user requirements have been met, suitability for the audience, suitability for the purpose, ease of use, how effectively the design principles have been met and areas that could be developed further to meet audience needs.</li> <li>● Students use the user interface they created in lesson 30 'Developing a functional user interface' and practise reviewing a user interface.</li> <li>● Students create checklists to support their review of the user interface to determine whether outcomes have been achieved against the areas listed above.</li> <li>● Students use this information to make a list of areas that could be improved.</li> <li>● Students explain how these changes will make the user interface more effective.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students consider why it is important to review a user interface.</li> <li>● Students identify the factors they should consider when reviewing a user interface.</li> </ul>	Copies of GameExchange123 case study (see Appendix A).  Word-processing software for students to record their findings.

Lesson	Topic from specification	Suggested activities	Classroom resources
33	Reviewing the project planning techniques  [Component 1, C3, Review]	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>Students explain why a project manager should review the effectiveness of the project management techniques they have used. Students should consider why they would still do this even though the project is complete.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students are introduced to areas they would consider when reviewing their project planning tools, including how well the project planning tools met the needs of the task, how well the chosen methodology met the needs of the task, the impact of using an iterative approach, how they overcame project constraints and what lessons they have learnt.</li> <li>Students practise reviewing the project planning tools they created/used in Learning aim B (e.g. SMART objectives, task list, graphical/textual descriptions and time plans).</li> <li>Students use the checklists created in previous lesson to determine if these techniques were suitable for the tasks undertaken in Learning aim B.</li> <li>Students consider the areas that they did not tick and discuss the possible reasons why.</li> <li>Students discuss if they would use the same project planning techniques if they had to carry out a similar project in the future.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>Students consider why it is important to review project planning techniques.</li> <li>Students identify the factors they should consider when determining if the project planning techniques they used were suitable.</li> </ul>	Copies of GameExchange123 case study (see Appendix A).  Word-processing software for students to record their findings.
34	Preparation for assessment: Recap of Learning aim C	<p><b>Introductory activities</b></p> <ul style="list-style-type: none"> <li>Teacher recaps topics covered in Learning aim C.</li> </ul> <p><b>Main session activities</b></p> <ul style="list-style-type: none"> <li>Students practise for assessment independently, using suggested activities below.</li> <li><b>Suggested activity 1:</b> using suitable software tools, students develop the user interface for the web page design specification they produced at the end of Learning aim B. This should include:                             <ul style="list-style-type: none"> <li>the overall look and feel</li> <li>how the user inputs data</li> </ul> </li> </ul>	Word-processing software for students to complete their assessment.

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"> <li>○ how the interface responds and will output to the user</li> <li>○ how the user navigates around the user interface</li> <li>○ how the user interactions match user expectations.</li> <li>● When students have completed their user interface they then need to gather feedback by:               <ul style="list-style-type: none"> <li>○ presenting the user interface to potential users</li> <li>○ allowing potential users to use the user interface, and then obtaining and recording feedback</li> <li>○ refining the user interface to account for potential user feedback</li> <li>○ repeat this process until the user interface is complete.</li> </ul> </li> <li>● <b>Suggested activity 2:</b> students need to review the strengths and weaknesses of their created user interface and their project planning techniques.</li> <li>● Students describe how their user interface makes use of different design principles and to what extent it has made good use of these principles and how they can determine that.</li> <li>● Students describe how users interact with their user interface and how easy it was for users to use and how they know this.</li> <li>● Students describe how their user interface is suitable for its audience and purpose.</li> <li>● Students state how the user interface can be further developed and then analyse how these changes would better meet the user requirements and design principles.</li> <li>● Students evaluate the effectiveness of their chosen project methodology.</li> <li>● Students assess the extent to which their choices helped to make the project a success.</li> <li>● Students explain how they overcame project constraints.</li> </ul> <p><b>Plenary activities</b></p> <ul style="list-style-type: none"> <li>● Students to reflect on how they approached the practice activities, including areas they enjoyed and areas they found more difficult.</li> </ul>	
35/36	End of Learning aims B and C: formal assignment	<p><b>Introductory activity</b></p> <ul style="list-style-type: none"> <li>● Teacher introduces assignment briefs for Learning aims B and C and discusses the criteria, explaining the command words used.</li> <li>● Teacher leads a check on understanding of key terminology.</li> </ul>	Pearson authorised assignment brief or brief produced and verified by school

Lesson	Topic from specification	Suggested activities	Classroom resources
		<ul style="list-style-type: none"><li>• Teacher reminds students that the assignment is formal and must be their own work. Once it has been submitted it cannot be revised or modified. They suggest students make notes to plan their response.</li></ul> <p><b>Main session activity</b></p> <ul style="list-style-type: none"><li>• Students complete an assignment in class or for homework.</li></ul>	

## Resources

In addition to the resources listed below, publishers are likely to produce Pearson-endorsed textbooks that support this qualification. Check the Pearson website (<http://qualifications.pearson.com/endorsed-resources>) for more information as titles achieve endorsement.

### Websites

<https://accessibility.blog.gov.uk> – search for ‘Dos and don’ts on designing for accessibility’. This website provides useful information on how to create accessible user interfaces to meet a range of different user needs.

<https://www.apm.org.uk/> – search for ‘What is project management?’ This website introduces students to the basics of project management, including a definition, core components and when project management is actually needed.

<https://www.computerworld.com/> – search for ‘IT’s biggest project failures – and what we can learn from them’. This website gives a list of real-life IT projects that have failed and the reasons why.

<https://www.pinterest.com> – search for ‘mood boards’. This website displays additional mood boards for different purposes, which enables students to see a range of different mood boards and provokes discussion.

<https://tinkerlab.com> – search for ‘9 Inspiring Mood Board Examples’. This website displays various different mood boards for different purposes, which enables students to see a range of different mood boards and provokes discussion.

<https://www.usability.gov/> – search ‘What & Why of Usability’ for ‘User Interface Design Basics’. This website provides useful information on how to create user interfaces that are easy to access and easy to understand and use to facilitate those actions.

<http://usabilitypost.com> – search the 2009 archive for ‘8 Characteristics of Successful User Interfaces’. This website provides a summary of the areas that should be followed when creating effective user interface design.

<https://en.wikipedia.org> – search for ‘List of failed and overbudget custom software projects’. This website gives an additional list of real-life IT projects that have failed and the reasons why.

### Textbooks

Galitz, W., *The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques* (3rd edition), John Wiley & Sons, 2007, ISBN 9780470053423 – this book contains examples of how to create effective design methodology, and how to design and organise screens to make their displays easier and more comfortable to use.

Graham, N., *Project Management for Dummies* (2nd edition), John Wiley & Sons, 2015, ISBN 9781119025733 – this book gives useful information on how to make project planning more effective, how to manage resources, how to keep the project under control and common causes of project failure.

Johnson, J., *GUI Bloopers 2.0: Common User Interface Design Don’ts and Do* (2nd edition), Morgan Kaufmann, 2007, ISBN 9780123706430 – this book contains the relevant theory of how to create effective user interfaces and common mistakes that designers make.

Newton, R., *Project Management Step by Step: How to Plan and Manage a Highly Successful Project* (2nd edition), Pearson, 2016, ISBN 9781292142197 – this book gives useful information about the basics of project management, how to create comprehensive, realistic and manageable project plans and how to resolve issues effectively.

## **Journals**

*Project Management Journal* (Project Management Institute) – contains useful information about different project management tools and real-life case studies of small and large projects that have been completed. Also gives information that contributes to the failure or success of each project.

*User Interface Design Principles for Interaction Design* (The MIT Press Journals) – contains useful information about the diversity of users and how the needs of users differ dramatically for people of different generations.

## **Videos**

Search YouTube for the following videos.

9 Month Old Baby Using iPad – a video showing a baby using a tablet computer, which helps students to discuss what age they think people start to have a deeper understanding of how user interfaces work.

Introduction to UIA: Microsoft's Accessibility API – a useful video showing how to make use of different accessibility features for different user needs.

UI Design Process: From Sketch to GUI – a useful video showing how initial ideas are created through sketches and then how they are transformed into an effective user interface.

Project Management – Critical Path – Example 1 – a video showing an introduction on how to construct a critical path diagram.

How to draw a Gantt Chart in less than a minute – a video showing an introduction on how to construct a Gantt diagram.

How to create a PERT chart – a video showing an introduction on how to construct a PERT chart.

## Appendix A

### Project – GameExchange123

#### Project brief

GameExchange123 is an online company that operates in the UK. They buy used computer games and then sell them to make a profit. Users log in to the website, enter details of the games that they want to sell and are then offered a buying price. If they are happy with the price, they will post their games and the money will be transferred to their bank account.

The company has grown in recent years and now has approximately 500,000 users. 75% of their customers are aged 18–25. The company's annual revenue is £6.2 million. They want to set up a smartphone app to keep up with their competitors. The app should provide the same functionality as their website. They have asked you to design and develop the user interface of their new app. They want to view the design of the user interface at different stages and to have opportunities to provide feedback.

#### Requirements

##### *Screen 1 – Homepage*

The homepage should welcome the user to the app and display a list of games that are currently high in demand. There should be a search facility to allow the user to enter the name of a game they want to search for and the results will be displayed on the screen.

##### *Screen 2 – Log-in/sign-up page*

This page should allow users to enter their username and password. Once they have successfully done this, they will be shown their account information. They should be able to view and update their personal details.

If users do not already have an account, then there should be a link to a form allowing the user to sign up and create an account. The user should be able to enter their:

1. first name
2. surname
3. address
4. postcode
5. telephone number
6. email address
7. what type of games console they have.

Suitable outputs and prompts should be given to support the user when they are entering these details. The app should confirm when their account has been successfully set up.

### *Screen 3 – Buying page*

This screen should allow users to enter details of the game they want to sell. They should be able to enter:

1. the barcode number
2. the condition of the box/packaging (i.e. poor, satisfactory, good, excellent)
3. if the user manual is still available (i.e. yes, no)
4. the condition of the disk (i.e. poor, satisfactory, good, excellent)

Suitable outputs and prompts should be given to support the user when entering these details. When all these details have been entered, the app should then display a buying price. The user can then accept or decline. If the user accepts the buying price, then a code should be generated and displayed on the screen for them to send with their game in the post.

### **Additional requirements**

The user interface should:

1. be suitable for the hardware and software that is found on smartphones
2. be suitable for the age, skill level and past experiences of the user
3. have a range of suitable accessibility features
4. make effective use of design principles to allow users to navigate the user interface effectively and efficiently
5. use the most appropriate type of user interface to meet the requirements in this brief
6. promote the company house style by using the colours black and blue.

The project should be completed in six weeks.