Unit 7: Mobile Apps Development

Delivery guidance

In this unit, your learners will investigate mobile apps, the devices that they run on and the uses of apps in society. They will then go on to design and develop their own apps to run on mobile devices. As the mobile technology industry is booming and mobile apps are becoming increasingly important to many organisations, you should be able to identify plenty of real-life examples, guest speakers from local developers and relevant demonstrations to support your teaching.

Approaching the unit

Learners should have access to adequate mobile app development environments and mobile devices (such as those stated in the unit specification) in order to complete the assessment for this unit. Preferably, learners will have access to a selection of devices and environments as this will give them more opportunities for comparison with development options. You may also wish to give learners access to online emulators to enable them to test the apps across a range of situations.

This delivery guide does not cover everything that needs to be delivered for completion of this unit but gives examples of delivery methods. You should refer to the specification for full details of all the content that needs to be covered.

Delivering the learning aims

You could begin learning aim A by discussing how learners use their mobile phones. It is likely that many, of your learners will have smartphones. Learners could discuss the kinds of apps that they use and the different contexts in which they use them. This could lead on to a discussion about the specific apps they use, how and why they use them. Ask learners to consider why designers should ask themselves these questions:

- Are users more or less likely to use apps that are free, are free but have in-app purchases, or ones that they have to pay for.

- For 'Paid for' apps is there, a maximum that they would expect to pay?

Learners will need to have a good understanding of the different types of mobile app that are available (e.g. native, web and hybrid) and how they are implemented and used. When you are introducing the types of app and the contexts of their use, you could include the use of device functions within apps then move on to talk in greater depth about the way in which apps are integrated with a mobile device and what this means for designers.

Introduce your learners to programming and programming environments for mobile development as early as possible. Allow regular periods of time for them to work with development tools, especially if they have not yet done any programming in their other units. This will ensure that they understand the options available to them and will allow them to practise their skills before starting work on learning aims B and C.

Throughout learning aims B and C, guide learners through the process of choosing appropriate methodologies that they could use in their designs. Learners should also be familiar with the different techniques used in app design and be confident in applying those that they will use in their own designs. When designing their mobile apps, learners must be aware that, as with any software design, they should demonstrate that they understand:

- The requirements for the app (as listed in B1 of the specification) – Learners should analyse the scenario in more detail in order to identify the different mobile computing requirements needed.

- What their design will include and what it will not include and why. This should be presented in the form of detailed design documentation, the contents of which is given in Topic B2 of the specification.

Throughout the design stage the learner should seek feedback form the client (and where possible test users) in order to refine the quality and appropriateness of the design. They should keep records documenting this process, by keeping records of feedback received and changes made, to contribute to the final evaluation.

As far as possible, learners should consider their project in terms of the stages of software development, including analysis, design, development and testing. Give your learners as much time as possible to gain the practical skills that they will need to use in their own project, and teach them how to use the chosen environment.(e.g. Android Studio, Visual Studio Code, Xcode) You should also make sure that they are able to make use of a wide range of mobile device features, and the tools and techniques listed in Topics C1 and C2 of the unit specification.

Throughout their practical work, learners should be encouraged to keep a diary, to record their progress, any issues they encountered and how they overcame those issues. This will be valuable for them when writing their evaluation and reflecting on their own performance as part of the second assignment.

High quality, accurate written and verbal communication skills are vital for progression into higher education and in employment. As such, learners should be confident in presenting thoughts and ideas to others, allowing learners to engage with a 'client' and test users, is a great way to develop this skill. It is a good experience for learners if a real-life client can be found, but this can be simulated with the Tutor, or other responsible adult, acting as the client. Learners should also produce well-presented, accurate and appropriate documentation for all stages of a project. Learners must be able to effectively evaluate the success of a project and the factors that contributed to the final outcome, including their own skills, knowledge and behaviours.

Assessment model

Learning aim	Key content areas	Recommended assessment approach
A Investigate mobile apps and mobile devices	**A1** Types of mobile apps **A2** Context of mobile apps **A3** Mobile device integration **A4** Mobile app programming	A report evaluating bespoke mobile apps running on different mobile devices. An analysis of mobile device functions and the context in which mobile apps are used and an evaluation of the effectiveness of the implementation of mobile apps.
B Design a mobile app that utilises device functions	**B1** Requirements for an app **B2** Designing a mobile app	Analysis, design and development of a mobile app. An analysis of context. Product design documents. A log of the development process, annotated code, screenshots of running app or demonstration of app running on a mobile device. Testing documentation, including a test log, log of errors and any resolutions made.
C Develop a mobile app that utilises device functions	**C1** Content preparation for mobile apps **C2** Developing a mobile app **C3** Testing a mobile app **C4** Lessons learned from developing a mobile app **C5** Reviewing own skills, knowledge and behaviours	

Assessment guidance

The recommended assessment approach is to assess this unit using two assignments: one covering learning aim A, and one covering learning aims B and C.

This section gives only an overview of the assessment requirements. Centres should refer to the 'Essential information for assessment decisions' and 'assessment criteria' sections of the specification for specific and detailed assessment requirements.

The first assignment should ask learners to evaluate mobile apps and the devices that use them and to discuss how the requirements of an app influence its design. They should also discuss the technology available in mobile devices and the impact that this has on the design and implementation of mobile apps.

Learners should investigate at least one app that is implemented across multiple platforms (e.g. available on both Android® and Apple® devices). The report could be in the form of a written document, but a blog or some form of audio or visual evidence would also be acceptable and would allow learners to develop their creativity, provided the information is communicated in a clear and detailed manner using appropriate language.

The second assignment should ask learners to design, develop, and evaluate their own mobile apps. Learners will need to prepare their content (graphics, audio etc.) for use on their targeted device and

they should be encouraged to use assets developed in other units, where possible. By the end of the project, learners should have produced a functional mobile app with an associated development report.

Getting started

This gives you a starting point for one way of delivering the unit, based around the recommended assessment approach in the specification.

Unit 7: Mobile Apps Development

Introduction

Mobile devices are prevalent in our society, with many people possessing more than one, and the mobile technology industry is still growing. Nowadays, many software developments must be compatible with mobile devices. Almost all public-facing companies and organisations have an app for their customers.

As mobile app developers, your learners will need to analyse the device functionality required by apps and the capabilities of mobile devices. This will give them an understanding of the potential and the limitations of different mobile solutions.

Learning aim A: Investigate mobile apps and mobile devices

Learners should be equipped with a range of skills and knowledge before starting the assignment – do not use the assignment as a vehicle to teach the content

- Learners could begin by investigating apps that they are familiar with and some that you introduce. In a wider context, learners could be asked their opinion about whether some apps could be considered risky (for example apps that give a medical diagnosis, or which claim to give advice and therapy to help users manage their mental health). Learners should be able to distinguish the type of an app (native, widget, game etc.) and the context of an app (locale, utility etc.).

- As learners need to have knowledge of several implementation options, you should give them examples of different types of mobile devices (e.g. phones and tablets, wearable technologies such as Apple® watches, and different operating systems and makes and models of device).

- Learners must understand the process of designing an app for use on a mobile device. Give them examples of good practice and case studies for development of mobile apps. You could discuss how developers discover the need for an app, what the type and the context of the app would be and how the functions of the device would be used. A good example to discuss is the concept of 'Hive®'. You should include a discussion about how plans are initiated and what should be taken through to the design stage (covered in learning aim B).

- Demonstrate some examples of mobile device functions, such as accelerometers, global positioning systems (GPS) and apps which can read ambient temperature. Discuss with learners how different apps might use these functions in different ways, and the implications that these functions have for the design and development of mobile apps. It would benefit learners to have access to devices with the functions that you demonstrate and discuss, so that they can investigate the uses of each function.

- Work with learners to develop their analytical and evaluative skills. Explore a range of different devices and give learners opportunities to consider the requirements of each one.

Learning aim B: Design a mobile app that utilises device functions

To help learners to understand the theory behind mobile apps in context, you could refer to the apps, devices and functions identified in learning aim A. Learners should be equipped with a range of skills and knowledge before starting the assignment – do not use the assignment as a vehicle to teach the content.

- In groups, learners could consider a range of scenarios and discuss the types of app that could

be designed for each. Group discussions will help to generate ideas and give learners useful insights, even though they will ultimately work individually on their projects.

- Learners must be familiar with software development and the types of design documentation that they will need to produce and should understand the importance of documenting any design and development activity. Give learners real or simulated examples of the design process and documentation and talk through the different stages of the process and the different features of the documentation.

- Learners will need to design the purpose, interface and algorithms for their apps. To this end, they should be confident in using diagramming techniques and pseudocode. To build their confidence, learners could investigate an app that is widely available and produce design diagrams and pseudocode to describe the app.

- Learners should present their designs to their peers for review, refining their designs as necessary in response to constructive feedback. This activity could be done a number of times throughout the design process, and you could organise it as a 'Dragon's Den'-style pitch, in which learners present their idea to potential 'investors' or as presentation-and-feedback sessions to learners acting as clients or other professionals.

Learning aim C: Develop a mobile app that utilises device functions

- Give learners samples of design schematics and demonstrate some of the steps in developing software from the schematics.

- Learners should have opportunities to create simple apps from given design schematics to enable them to build up their skills in using development techniques to create apps.

- Learners should be given time to develop their app development skills. This could be achieved through a combination of focused class activities, to teach specific techniques, workshops that are more open and explore wider concepts, as well as self-directed study using online tutorials or other similar materials.

- Discuss what is meant by 'evaluating the effectiveness' of an app. You could get learners thinking about this by choosing an app that is widely available and identifying the requirements that it should fulfil. You could then ask learners to evaluate its effectiveness against these requirements.

- Ask learners to present prototypes of their apps to a small audience, perhaps as a small-group task. They should use appropriate tools and techniques for their app, such as programming constructs, event handling and device capabilities. Ensure that learners have experience of ongoing feedback and development of their products and ensure that they understand how they could contribute feedback to support the activities of others. Give learners opportunities to test, evaluate and refine products. Work with learners to develop time management skills to ensure a full development lifecycle can be applied to a product. This should be done late enough in the development for learners to have a functional app, but early enough for them to have time to make refinements based on the feedback they receive.

- Learners should understand the benefits and limitations of mobile devices in terms of effective preparation of content. This should be related to specific devices. You could put learners into groups where they will discuss a particular device or type of device (e.g. Apple iPhone® devices or Samsung Galaxy® devices) in terms of its benefits and limitations. Each group could then present their findings to the other groups.

- Learners should test their mobile apps for functionality, compatibility, usability, performance and acceptance. Their testing should go beyond their own testing activities or using learners in their group to test their apps. They should perform these tests using a variety of methods, such as white-box testing and black-box testing. They should rectify any issues that arise from these tests.

- As the development process continues, learners should demonstrate their apps to a larger audience and gather feedback from sample users to identify potential improvements and the overall level of acceptance. This could form the basis for their evaluation of their app with regard to requirements and user feedback.
- Throughout the learning aim, ask learners to self-reflect on their performance and their overall approach to the tasks that they complete. You could encourage them to use tools such as SWOT analysis to identify their strengths and any areas for improvement.
- It will benefit learners to maintain a diary or take notes as they complete the various practical activities in the lessons relating to this learning aim. They should also note the comments that their peers make when they give feedback.
- Ensure that learners understand how to fulfil the assessment criteria for the pass, merit and distinction grades.

Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

This unit links to:

- Unit 1: Information Technology Systems-Strategy, Management and Infrastructure
- Unit 3: Using Social Media in Business
- Unit 4: Programming
- Unit 6: Website Development
- Unit 8: Computer Games Development
- Unit 9: IT Project Management
- Unit 11: Cyber Security and Incident Management
- Unit 14: Customising and Integrating Applications
- Unit 16: Digital 2D and 3D Graphics

Resources

In addition to the resources listed below, publishers are likely to produce Pearson-endorsed textbooks that support this unit of the BTEC Internationals in Information Technology. Check the Pearson website at http://qualifications.pearson.com/endorsed-resources for more information as titles achieve endorsement.

Integrated Development Environments (IDE)

There is no specific recommendation of which IDE to use. Centres are free to choose which ever IDE is best to meet local requirements and the demand of the assessment. Some possible IDEs include:

- *Visual Studio Code* – Cross platform Multi language IDE
- *Android Studio* – Android App development tools produced by Google
- *Xcode* – iOS app development environment.

Websites

- *http://developer.android.com/index.html* - Android development portal.
- *https://developer.apple.com* - Apple iOS development portal.
- *https://dev.windows.com/en-us/* - Microsoft Windows development portal.

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