The specification for:

Level 2 Certificate in Mobile App Development

This is version 1 of the TLM handbook for the Level 2 Certificate in Mobile App Development. Further printed copies can be obtained from Lulu.com or the pdf freely downloaded from www.tlm.org.uk.

The Qualifications and Credit Framework (QCF) was designed by the UK government's Qualifications and Curriculum Development Agency now replaced by Ofqual. The QCF is referenced to the European Qualifications Framework devised by the European Union. ITQ is the qualification framework based on the UK National Occupational Standards for IT Users developed by eskills and the Awarding Organisation Forum that is made up of all the Ofqual accredited organisations that offer IT User qualifications.

The assessment model for the qualifications presented in this publication was designed by TLM in consultation with our development centres

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Contents

1. For those in a hurry!

Please read the rest of the book later as the details are important!

1.1	TLM's assessment model is common to most of its qualifications. It is based on competence-based assessment of coursework using a portfolio of evidence and supported by a free optional cloud-based evidence management system.
1.2	Learners must demonstrate competence against the assessment criteria from their day to day work and the teacher assessor must verify that they are competent in relation to the general level descriptor using indicative assessment criteria. TLM's external moderator will check the judgements and the quality of the evidence and provide feedback. This process is not graded, the intention is that it is a flexible way of checking basic practical competence in the subject at the qualification's framework level.
Procedures	
1.3	The first thing to do is to arrange assessor training with TLM. TLM trains at least one assessor as Principal Assessor who must accept responsibility for standards within the Centre. The Principal Assessor can train and appoint assessors within the Centre as long as they are competent to take on the work and are willing to sign an agreement on the web site to uphold standards.
1.4	TLM will provide initial training in the pedagogical model and using the supporting technologies to provide the evidence needed. The purpose is to get you started and then we provide on-going support to ensure you are confident and we can work as a professional partnership. We advise new Centres to do some coursework assessment early so that they can receive feedback and quickly become confident in doing routine coursework assessment. Our aim is to make this no more onerous than normal routine assessment that anyone would do as a normal part of the teaching job. This gives more time to focus on teaching and therefore to support raising attainment.

2. Introduction

The Level 2 Mobile App Development qualification is designed for a wide range of abilities and for people who require skills and competence in the mobile app industry. There is a wide range of units available for all skill levels and interests.

2.1 **Level 2 Certificate for Mobile App Development**

The Level 2 Certificate is a qualification designed for people who require skills and competence in mobile app developments. The qualification consists of a mandatory unit and optional units to make up the 16 credits required:

Mandatory

Unit 1 - Improving Productivity Using IT (4 credits).

Optional

Centres can choose a range of set optional units for their cohort or can work on a wider set of options so that learners can specialise in something that interests them.

There are currently 3 optional units to choose from.

3. Summary of Qualification Specification

3.1 Level 2 Certificate (Annexe A)

The Level 2 Certificate is a qualification designed for people who require a wide range of skills in IT and specifically in the design of mobile apps. The qualification consists of a mandatory unit Unit 1 - Improving Productivity Using IT (4 credits). The qualification consists of 16 credits so learners can make up the credits with optional units.

Qualification Title: TLM Level 2 Certificate in Mobile App Development
Qualification Number: 603/7242/4
Qualification Level: Level 2
Total Credits: 16
Guided Learning Hours: 120
Total Qualification Time: 160
Assessment Methods: Coursework, E-assessment, Portfolio of Evidence

Assessment
Learners must demonstrate competence against the assessment criteria from their day-to-day work and the teacher assessor must verify that they are competent in relation to the general level descriptor using indicative assessment criteria. TLM's external moderator will check the judgements and the quality of the evidence and provide feedback. This process is not graded, the intention is that it is a flexible way of checking basic practical competence in the subject at the qualification's framework level.
Mandatory Unit - Unit 1 - Improving Productivity Using IT (4 credits)

3.5 Assessment

The internally assessed, externally moderated coursework for all qualifications is pass/fail but by submitting the evidence for external moderation, feedback can be given to the teacher on areas to improve for resubmission.

Evidence must be provided against the unit assessment criteria from practical tasks related to the learners' everyday work supported by IT.

The way evidence is gathered is up to the assessor, the only requirement is that it clearly supports the judgements against the assessment criteria and the relevant learning outcomes.

If on moderation the account manager finds gaps in evidence relating to a particular candidate, they will request more evidence before approving the award or the unit certificate. Assessors must then adjust their work to ensure all their learners are providing the appropriate level and breadth of evidence.

We encourage early submission of at least some evidence so that assessors are confident from the feedback that what they are providing is sufficient. In this way we can maintain standards while supporting improved efficiency.

4. Qualification Content

Mandatory	Optional (for reference)
4 CREDITS	**12 CREDITS**
Unit 1 Improving Productivity (4 credits)	**Unit 2** Fundamentals of Coding and Development (4 credits)
	Unit 3 Developing Mobile Apps (4 credits)
	Unit 4 Creating Connected Apps (2 credits)

5. Transferable Skills

5.1 Key Subject Aims

The over-arching aim is to enable learners to support their learning in all subjects using IT tools that are freely and legally available from the internet. Subordinate aims include:

- Developing the skills needed for employment.
- Gaining practical experience and competence with contemporary technologies including programming where appropriate.
- Increasing the capacity to transfer knowledge and skills between contexts.
- Developing practical skills in creativity and problem solving.
- Developing an understanding of the social and commercial impact of IT.
- Developing an understanding of the legal, social, economic, ethical and environmental issues raised by IT.
- Developing safe, secure and responsible practice when using IT including reducing risk.
- Developing the skills to work collaboratively with IT.
- Developing skills in critical evaluation and feedback.

5.2 Knowledge and Understanding

The following knowledge and understanding will be required to support learning for the qualification.

- Demonstrate knowledge and understanding of audiences at which work is targeted.
- Understand the purpose in common applications and/or applications they have used.
- Demonstrate knowledge and understanding of strengths and weaknesses in the way information is presented.
- Demonstrate knowledge and understanding of intellectual property.
- Know common file types and the implications of open and proprietary standards.
- Understand information flow starting with input of information, to processing and output.
- Understand the costs associated with different applications including direct and indirect costs.
- Have the confidence to deal with the unfamiliar such as the code in a computer program and work out what to do.
- Understand the principles of ordered lists of instructions underpinning algorithms.
- Understand abstraction as picking out common features of objects in order to simplify. e.g. A common structure for a template to input information into different systems.
- Understand the benefits of target setting for IT projects.
- Know specific characteristics of software in order to make choices of tools.
- Demonstrate a practical understanding and respect for acceptable use policies.

5.3 Skills

Opportunities are provided to support the following skills, the great majority of which will be assessed directly.

- Select, use and integrate IT tools and techniques to meet needs.
- Find, select and evaluate information for its relevance, value, accuracy and plausibility.
- Manipulate and process data and other information, sequence instructions, model situations and explore ideas.
- Transfer competence in a familiar context to an unfamiliar context.
- Communicate data and information in a form fit for purpose and audience.
- Adopt safe, secure and responsible practice when using IT.
- Develop appropriate and effective IT-based solutions in a range of contexts including computer programming solutions.
- Self and peer assess to gauge the effectiveness of their own learning.
- Think creatively, logically and critically evaluate their own and others' use of digital technologies.

6. Support

	Guidance and Assistance
6.1	There is further guidance for coursework assessment on the TLM web site. All centres have an assigned Account Manager who will be pleased to help at any time. Our aim is to give professional assessors, most of whom are qualified teachers, the confidence to make judgements with a minimum of bureaucracy so that they can focus their time on maintaining their professional knowledge, skills and supporting learning through effective teaching rather than “chasing paper”. There is often a confusion between bureaucracy and rigour, since unnecessarily complex bureaucracy can actually detract from rigour by obscuring the importance of the outcomes.
6.2	**Web sites** - TLM provides support through cloud-based systems. Providing assessment grades and the management of certification through the Markbook Site is mandatory and all assessors are provided with training in its use. It is simply a matter of recording learner competence against the unit criteria as the evidence is collected and claiming a certificate on behalf of the learner when a unit has been fully assessed.
6.3	The **community learning site** provides free optional facilities for learners to submit their evidence on-line, linking it to the assessment criteria across single or multiple units. The assessor can accept or reject this evidence and comment on it providing a full audit trail for evidence. Moderator/verifiers can get immediate access to this evidence and so it is potentially a lot more efficient than alternative methods. No paper, no e-mails with file attachments necessary. There are facilities for progress tracking that can be based on criteria and/or units. The system can be linked as an extension to any standards compliant VLE/e-portfolio system for centres that are already committed to a specific VLE product. Training can be provided, and free support is available from your Account Manager. The aim is to eliminate all paper-based bureaucracy, all screen-shots and referencing that draws time away from teaching.
6.4	**Telephone** and e-mail support are available to all Centres. There is a general convention of firstname.secondname@tlm.org.uk for e-mail addresses. It is usually best to e-mail your account manager in the first instance. Google hangouts can be arranged for video conferencing support.

7. Registration & Procedures

	Registration
7.1	TLM's subscription model enables schools to enter learners at times convenient to them. There are no late entry fees and no additional fees should a learner fail to produce evidence at a level but can meet the criteria at a lower level. This can reduce costs to the school when compared to GCSEs and significantly more than this when compared to some GCSE alternatives. There are no fees for replacement certificates or verification of certificates because all certificates can be directly authenticated against TLM's secure database. For details of current subscription costs please contact us or refer to the web site.
	Internal standardisation
7.2	The Principal Assessor has the ultimate responsibility for consistency in assessment standards within a centre. All assessors have signed a contract agreeing to uphold standards and should therefore co-operate with the Principal Assessor and Account Manager at TLM to ensure that standards across the centre are consistent. It is advisable to send work samples to TLM early to check that evidence is at the right standard so that there is time to make any adjustments necessary to the course and learner expectations. TLM will generally check a higher quantity of work from new assessors and feedback to ensure that they are confident to make appropriate judgements over time. This reduces risk and improves efficiency in the longer term.
	Authentication
7.3	All assessors must take reasonable steps to ensure that any coursework evidence submitted by candidates is a true reflection of the candidates' competence. This is in keeping with the assessor undertaking to uphold and maintain standards in the contract with TLM.
7.4	Certificates can be authenticated directly on-line using the certificate number or by scanning the QR code on the certificate. There is no charge and it makes it more likely that certificates will be checked and that in turn improves security. Certificate forgeries are a significant problem when authentication is not simple and straightforward because convincing forgeries are easy to achieve with recent technologies and will get easier as time goes on.

8. Other Considerations

	Access arrangements and special requirements
8.1	All TLM's qualifications are intended to be accessible, as widely as possible. There is an extensive policy documented on the web site at https://tlm.org.uk/policy-download-centre/ Centres should contact TLM if they have any questions related to accessibility issues.
	Language
8.2	The language for provision of this qualification is English only. This will only change if we have a significant demand in another language that is sufficient to cover the additional costs involved.
	Malpractice
8.3	TLM has comprehensive policies and procedures for dealing with malpractice. These are documented with links on the web site at https://tlm.org.uk/policy-download-centre/ Assessors should be familiar with these policies and make them clear to candidates. Assessors should inform their account manager if they suspect any instance of malpractice that could have a material effect on the outcome of any assessments, either for themselves or colleagues. This is part of the upholding of standards that is part of the contract with TLM.
	Equality of opportunity
8.4	TLM promotes equality of opportunity through policies and procedures. These are again documented in detail on the web site at https://tlm.org.uk/policy-download-centre/
	Resources, Support and Training
8.5	A clear goal is to enable learners to support all their IT user needs using resources freely and legally available from the internet. This is related directly to national policies for inclusion and equality of opportunity. The reality is that there is so much user dependence on proprietary applications that we can only support the transition to free and open resources through education and common sense.
8.6	TLM does not require centres to use Free and Open-Source applications but it certainly encourages them to do so. Most of the key software applications needed to support any of the assessed units are available freely from the web including office suites, graphics and sound editing. As a nation we could save hundreds of millions if not billions of pounds in software licensing fees by providing users with the skills, knowledge and confidence to migrate to free and open source applications. You Tube, OpenClipart.org, Wikipedia and many other sites provide free content that supports learning and the number and range of such sites is increasing.

Annexe A

Level Certificate - Unit assessment - coursework guidance

The **Level 2 learner** has knowledge and understanding of facts, procedures and ideas in an area of study or field of work to complete well-defined tasks and address straightforward problems. Holder can interpret relevant information and ideas. Holder is aware of a range of information that is relevant to the area of study or work. AND/OR Holder can select and use relevant cognitive and practical skills to complete well-defined, generally routine tasks and address straightforward problems. Holder can identify how effective actions have been. Holder can identify, gather and use relevant information to inform actions.	**Moderation/verification:** The assessor should keep a record of assessment judgements made for each candidate and make notes of any significant issues for any candidate. They must be prepared to enter into dialogue with their Account Manager and provide their assessment records to the Account Manager through the on-line mark book. They should be prepared to provide evidence as a basis for their judgements should it be required by the Principal Assessor or their Account Manager/external moderator. Before authorising certification, the Account Manager must be satisfied that the assessor's judgements are sound.

General Information

The Level 2 qualification has the following characteristics for learners:

- Achievement at QCF level 2 (EQF Level 3) reflects the ability to select and use relevant knowledge, ideas, skills and procedures to complete well-defined tasks and address straightforward problems. It includes taking responsibility for completing tasks and procedures and exercising autonomy and judgement subject to overall direction or guidance.
- Use understanding of facts, procedures and ideas to complete well-defined tasks and address straightforward problems. Interpret relevant information and ideas. Be aware of the types of information that are relevant to the area of study or work.
- Complete well-defined, generally routine tasks and address straightforward problems. Select and use relevant skills and procedures. Identify, gather and use relevant information to inform actions. Identify how effective actions have been.
- Take responsibility for completing tasks and procedures subject to direction or guidance as needed.

- The criteria are designed to provide opportunities to promote numeracy, literacy and social skills as well as ICT capability and are compatible with the UK National Curriculum programmes of study as well as the regulated qualifications framework. This provides opportunities to satisfy both needs concurrently.
- The specification for the Level 2 extended certificate provides an outcome framework for assessment and is not intended to dictate any particular context for learning and so can be used with young children or adults and be applied to a wide range of existing courses.

Requirements

- Standards must be confirmed by a trained Level 2 Assessor
- Assessors must as a minimum record assessment judgement as entries in the on-line mark book on the TLM certification site.
- It is expected that there will be routine evidence of work used for judging assessment outcomes in the candidates' records of their day to day work. Samples, including related plans and schemes of work should be available at the annual visit and/or by video conference.
- Different approaches to learning will be required in order to match differing needs, for example, the needs of children will be different from the needs of adults with learning disabilities.
- When the candidate demonstrates secure capability against each of the criteria in the unit, they are entitled to a certificate for passing the unit and the overall award.
- We expect at least 170 hours of guided study to be under-taken for the certificate for complete beginners generally new to formal education, but discretion can be used to take account of prior learning where this is sensible in individual cases. In terms of making the certificate, what matters is outcomes. Can the candidate securely meet the criteria?

The Mandatory Unit - Level 2, Unit 1 - Improving Productivity Using IT (4 credits)

1. Plan, select and use appropriate IT systems and software to meet needs	2. Review and adapt the ongoing use of IT tools and systems to make sure that activities are successful	3. Develop and test solutions to improve the ongoing use of IT tools and systems
1.1 I can demonstrate the effectiveness in using productivity tools in development projects	**2.1** I can review the on-going use of productivity tools and techniques and change the approach as needed	**3.1** I can review the benefits and drawbacks of productivity tools and systems used in terms of output and efficiency
1.2 I can develop digital products using the methods, skills and resources required to complete tasks successfully	**2.2** I can describe whether the productivity tools selected were appropriate for the task and purpose.	**3.2** I can describe ways to improve productivity and efficiency in development
1.3 I can plan how to carry out tasks using productivity tools to achieve the required purpose and outcome	**2.3** I can assess the strengths and weaknesses in my final work	**3.3** I can develop a workflow to improve my own productivity in development
1.4 I can demonstrate risk management to avoid factors that might affect the task.	**2.4** I can describe ways to make further improvements to my work	**3.4** I can test solutions to check that they work as intended
1.5 I can select and use productivity services to complete planned tasks and produce effective results.	**2.5** I can review outcomes to make sure they match requirements and are fit for purpose	

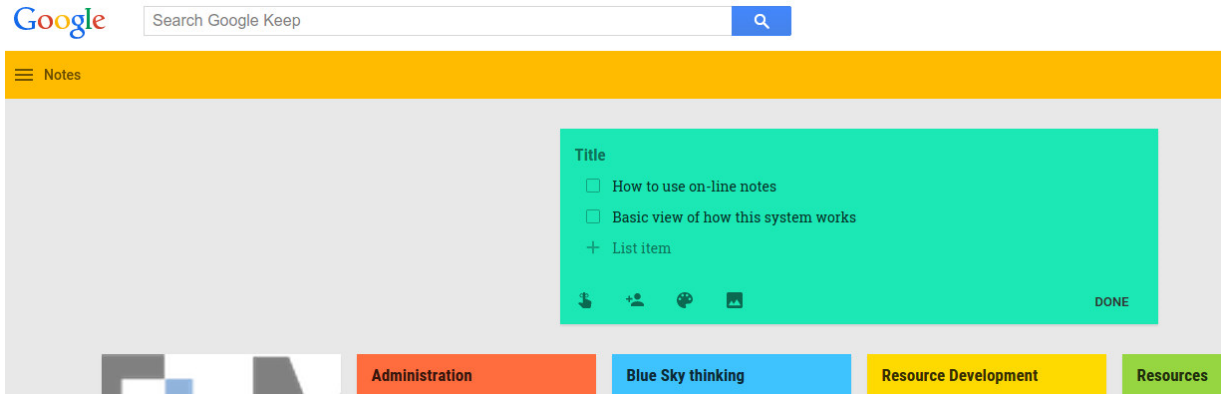
Assessment Method

Assessors can score each of the criteria L, S or H. N indicates no evidence and is the default starting point. L indicates some capability, but some help still required. S indicates that the candidate can match the criterion to its required specification. H indicates performance that goes beyond the expected in at least some aspects. Candidates are required to achieve at least S on all the criteria to achieve the full award.

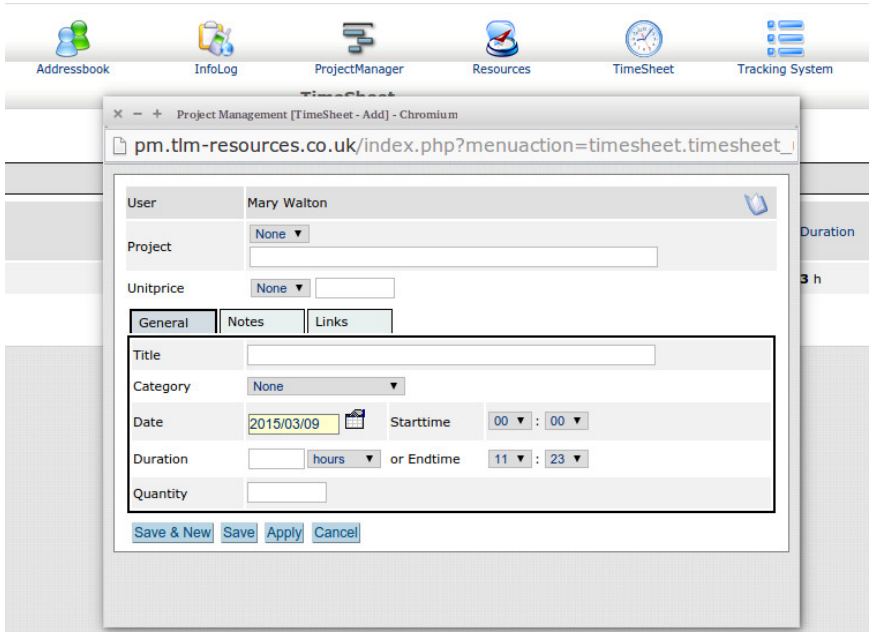
Expansion of the assessment criteria

Criteria	Additional Information and Guidance
1.1I can demonstrate the effectiveness in using productivity tools in development projects Candidates should be able to describe the purpose of their work and why using IT adds value to it in some way or ways. **Evidence:** will be provided directly from the presentation of work in web pages that has clear purpose and describes the purpose of the work.	• Candidates might describe the audience at which they are targeting their work and any aspects of the work that makes it particularly suitable for the audience e.g. "I used a word processing package to produce a series of documents for a local charity to use. To make the documents more attractive and personal to the company, I used a graphics package to make their custom logo. This graphic could be used on multiple documents, including web pages, as I made it a specific file format that can be scaled, exported and imported easily. I also created a spreadsheet so that they could better track their finances and incomes/expenses. Finally, I used a presentation package to show the charity my ideas and explain why I made the documents and logos the way that I did." Alternatively, "I used a public web page to collaborate with my friends in producing an information page about the local environment because it enabled us to work together effectively. It also made it easy for other people to contribute and made the results easy to link to other similar sites". They should be able to describe the key characteristics of writing formally to present part of a portfolio as opposed to the style used for chat and instant messaging of friends. The candidate will show evidence of understanding relevance in relation to purpose. Information that is irrelevant to a task will not support its purpose and inaccurate or biased information could be against the purpose. The main difference between Silver and Gold is that in Gold, description needs to be explicit, whereas in Silver it is enough to identify purpose e.g. from a list of options or other supporting structures. Their documented writings, blogs and/or files should contain descriptions in keeping with the guidance here.
1.2 I can develop digital products using the methods, skills and resources required to complete tasks successfully Candidates should be able to systematically analyse a task and match needs to resources. They should be able to describe the methods, skills and resources they need in some detail. **Evidence**: will be provided directly from the presentation of work in web pages that has clear purpose and describes the methods skills and resources relevant to successful completion.	• For example, as a method of presenting information to a general audience, using web pages is often a better choice than desktop presentation software. In a web page, the information is permanently and immediately available to the intended wide audience and this information can be linked to related information in other pages. These web pages can also be web page resources such as cloud based office files. They might need skills related to e.g. preparing images for use on-line so they are suitable sizes and load quickly on low bandwidth connections. They can describe issues related to copyright which are Personal Learning and Thinking Skills (PLTS) and accessibility if they intend others to use the information they prepare. The resources needed could include time, software, hardware or new learning and expertise. Again evidence of description will differentiate from Level 1. • Every successful project, especially using potentially complex and expensive aspects such as IT, needs to be properly planned and resourced. It is no good getting ready to deliver something to a customer and then discovering that a widget that makes it all work in the learner's environment is missing in the clients. Equally, it is good to set out some sort of method before you begin. You don't always need to be linear and follow a set route. In some cases, this may not be effective. The method might require you to downgrade a project. For example, many civil service based organisations still use very old and unsupported versions of web browsers such as IE 6, or they might use a very specific version of office software which is no longer possible to purchase. If you start out your product with modern designs and scripting elements, before checking what web access tools they have, you will waste a lot of time designing something that you think is great, but simply will

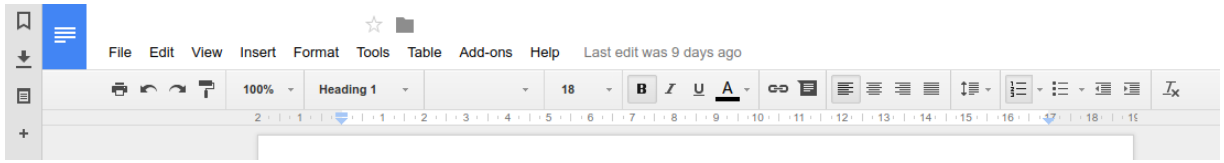
	not work. In this instance, the method should be to research what is practical before moving on to what is possible. The method here would be to gather all of the details about the client's system, then work on what can be designed given these limitations. Similarly, you may be living in a city or town with excellent Internet connectivity speeds. If you don't check with a customer what their own access speeds are like, then you will have problems delivering a media rich solution that will not work on a slow Internet. • In terms of describing the skills, a great many IT solutions fall down because of the huge amount of change they entail. It is great introducing a new system, but if the staff are not very confident users of IT, you will have to build in huge amounts of time and money for training, and this may still not be enough. In most instances, where possible, it is good to work on the idea of KISS. The more basic and workable your solution is, the better. There are obviously exceptions and if you are designing something for sophisticated users, then you will need to make it fit that need and skill set. • The resources you use need to be described in as much detail as makes it understandable to someone reading your work that does not have your skilled knowledge of IT. If something seems to be obvious to you, it might not be obvious to someone else, so it is always good to check with different people that it all makes sense as you go along. Did you survey possible users and find out how much they understand the resources, could you do this to have a clearer guide. As with the skills, implementing resources which are complex and time-consuming, mainly because you think they are good, may not be the best solution and therefore may not lead to your required success. • On that note, it is not a direct requirement of this criterion, but you do need to address the aspect of success. How do you know it was successful? If there are 10 users and 5 of them say it is OK, is that a success? Set yourself some measures. In terms of the examination, many IT projects use SMART methods on projects. Use these and work towards them on your project in terms of method, skills and resources to ensure overall success.
1.3 I can plan how to carry out tasks using productivity tools to achieve the required purpose and outcome Candidates should be able to provide clear and structured plans for tasks and at least one project of 20 or more hours. **Evidence:** A documented plan that supports a project presented in a digital format e.g. a web page, document file or IT planning software.	• Candidates should have planned a project of some complexity scoping the information flow. For example, designing a structure for an e-portfolio with a title page linking to subjects of interest, listing the information sources needed for input, the software tools they will use for processing information to include in their portfolio and the intended audience for their finished product. They should provide evidence that they have considered costs and where relevant the file formats generated by the tools in order to make information widely accessible. Will their work force other people to have to buy software in order to access it? Planning should consider such issues to avoid problems later on when the project has been completed (PLTS) • Plans should typically be based on an aim, some specific objectives and/or SMART (Specific Measurable, Attainable, Relevant and Time-limited) targets. Candidates should realise the importance of objectives and targets that can be rationally evaluated rather than vague statements of aim. An example in the context of a work portfolio might be to provide 3 screen sized pages for 3 subjects by 31st July. Resources required are 20 hours of time and access to the Drupal Content Management System. Plans should include concise descriptions of the methods and actions needed for success and these can relate directly to the range of assessment criteria in this section. • The main focus here is on the planning of the IT task or project, though obviously it also has to address the ending part here and achieve some outcomes or stated purposes. You could use some tool in order to aide their planning. This could be something basic like the Google Keep application:



The learners can colour code the different planning elements. Otherwise, you could set up some cloud based CRM system which has some time planning elements built in, such as eGroupware or similar.

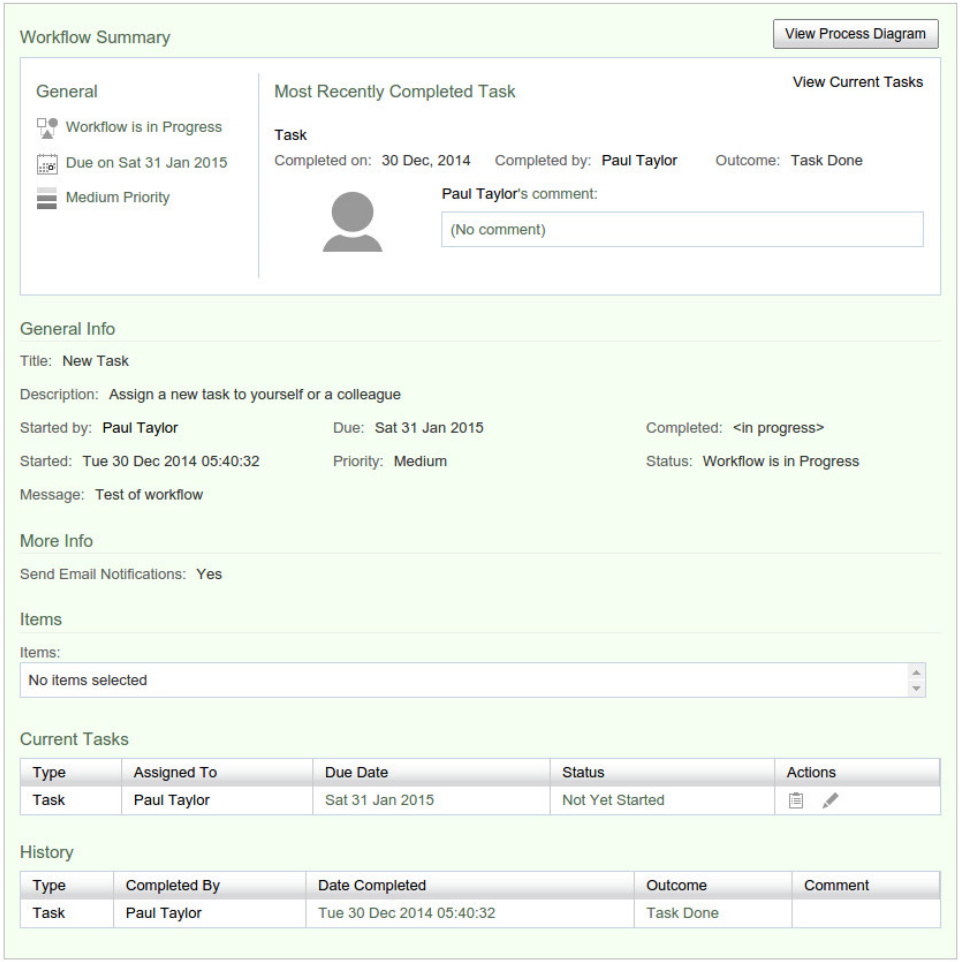


	The above is a system set up for TLM users with some pre-set login for users. The system has timesheets and project tools which can output graphs and reports. • It would be useful to set out some of the desired outcomes as targets. This will help reduce wasting time on things which seem quite good, but don't achieve anything that was set out in the initial plans. The same goes for the purpose. If the purpose is to make a more efficient system, then some of the outcomes should be quantitative, i.e. it will create a new document from a template in under 20 seconds. If it is more related to qualitative targets, then it could be something like 80% of the work force agreed that it was easier to use and the colour scheme was more relaxing.
1.4 I can demonstrate risk management to avoid factors that might affect the task. Candidates should be able to describe a range of factors that could affect the way they carry out their tasks. **Evidence**: Evidence from content of their web pages describing these factors and considerations in their planning	• Have they considered the time the task is likely to take, any copyright issues in obtaining suitable resources, cost of resources and any e-safety and/or relevant security considerations? This is not intended to be an exhaustive list. The factors considered simply have to be credible and useful in the planning process. Again, being able to describe the factors and relate them to the task is a Level 2 characteristic.
1.5 I can select and use productivity services to complete planned tasks and produce effective results. Candidates should have sufficient breadth of experience to make an informed choice about the IT systems and software to use. **Evidence**: Evidence from content of their web pages and day to day working files indicating effective results and appropriately selected supporting resources.	• Candidates should show evidence of making appropriate choices between different applications or systems in order to complete a project of some complexity. For example, they might choose a vector drawing program to originate diagrams rather than use a raster (bitmap) graphics program because of the greater flexibility in handling and scaling shapes. They might choose open-source applications for lower cost or ethical reasons. They might choose web-based systems for ease of linking to other information sources or sharing resources with others. A legitimate reason for choosing a particular system could be that it is the only one available, but candidates should be encouraged to question why this is the case given the growing list of freely accessible tools and resources on-line. A user guide describing the strengths and weaknesses of two different applications might be useful, for example, comparing different office software applications. • The following is a cloud-based package and a desktop based one. You can see the additional options with the desk-based package, but are all the features necessary for the task? Cloud Based

	 Desktop Based 
2.1 I can review the on-going use of productivity tools and techniques and change the approach as needed Candidates should be able to provide evidence of reviewing their work with specific focus on the IT tools and techniques they have used. They should describe at least three occasions where they have changed techniques, tools or approach as a result of evaluating their work in a project or projects. **Evidence**: Written recorded evidence in web pages or day to day document files describing their work	• One way to approach this would be for the candidate to maintain a Blog as a diary supporting their work. They can use the TLM learner site for this purpose or their own resources as long as evidence is accessible to the Account Manager for moderation and verification. Putting together their portfolio or providing a digital resource or service to the community are suitable activities that can be reviewed and documented in a Blog.
2.2 I can describe whether the productivity tools selected were appropriate for the task and purpose. Evaluation should include a description of the IT tools and their fitness for purpose. This can be organised as an analysis of strengths and weaknesses. **Evidence**: Evidence from documented description conforming to the criterion and guidance	• Candidates should be able to make clear judgements about the IT tools available to them supported by evidence. They should consider not only the "brand" but the functionality and cost including indirect costs such as dealing with viruses, upgrades and administering licenses. File formats generated by applications should be considered in relation to lock-in to a particular product that could reduce future choice. Assessors should provide guidance to get candidates to refer to specifics rather than general statements such as "I think the tools were appropriate" without justification. Listing strengths and weaknesses will help avoid bland generalisations. • For example, using a word processing tool the candidates could say that a clear strength of the application was that they could customise the interface so that only the icons they use most are visible. That way, it is easy to find the ones they want and not be confused and distracted by ones they never use. A weakness might be that the applications are generally made by American companies and the spelling default to US English. If the user is not aware of this and does not set this to UK English their auto-correction of spelling will be adding words that are incorrect. Similarly, a cloud-based word processor is good because it can be accessed

	anywhere, but a weakness is that it does not have all of the formatting tools of a desktop based version and some of the formatting added by a desktop application are lost when uploaded to the cloud based system. • The characteristic of Level 2 as opposed to Level 1 is the ability to describe specific aspects of the tools used and to make rational judgements about their properties. For example, the tool did or did not provide the facility to save a document in an open file format, the tools are expensive so only available to me in the place of work, the tools required some time to learn/were easy to learn. Some operations were slow and limited the speed I could work; I only used a very small number of the available features.
2.3 I can assess the strengths and weaknesses in my final work Candidates should provide evidence that they have analysed end products of their work and stated associated strengths and weaknesses taking into account feedback and views of other people. **Evidence**: Evidence from documented descriptions conforming to the criterion and guidance	• Strengths and weaknesses should relate to some of the following: format, layout, accuracy, structure, style, quality, clarity for audience. Getting candidates into the habit of using the strengths and weaknesses method and making an overall comment of judgement about the success of their work is recommended. They should get peers/intended audience to help them review and assess their outcomes. • This is always a hard criterion, regardless of how experienced the person is, since no-one really likes to say what they were good or bad at. It is a very important aspect of the process however. It helps to use specific areas to focus on. For example, using quantitative and qualitative measures helps. If these are determined as part of the planning in 1.3, then it makes it more straight-forward. • A quantitative measure is, as the name implies, based on a quantity. If your design is making a new template for an office application, how quickly can it load, how quickly can it be created or saved. A quantitative measure might be in collecting data. The existing paper-based system, for example, collected a total of 100 questionnaires and each one took 30 minutes to fill out, my web based solution collected 1,000 questionnaires and each one took 20 minutes. Both of these examples make it easy to measure strengths and weaknesses. For example, I expected my template to be ready to use and be completed by the user in 15 minutes, but it took 25 minutes. That gives a concrete problem to look at. Why is it taking so much longer than expected? What is the weakness here? Equally, it took 3 minutes less than I thought, so that is a strength that can be discussed. What made it work so much faster than expected. • A qualitative measure relates, again in the name, to the quality. This is a harder one as it is subjective. What I think of as a good quality operating system may not agree with what you think. However, it should still be possible to assess or measure some aspects of this quality. If you are designing a website, then most people, you hope, would find it attractive and appealing to use (a quality). If you carry out a survey once it is running and 80% say they don't like how it looks, then this is a weakness in the design that needs to be changed. Equally, if you have designed a database for a local company to assist in their customer relationships, a strength might be that users report that they are so much happier entering data as the design looks so good that they deal with customers more quickly. The customers will therefore recommend the company to friends and family. This is clearly a strength in the quality of your design. This can then be assessed. What made people so much happier to use the system? What aspect of the design was so strong to give this feeling?
2.4 I can describe ways to make further improvements to my work Candidates should use the evidence from their evaluations to inform ways in which future work can be improved.	• Analysis of strengths and weaknesses as the work progresses forms the foundation for this assessment. Include examples from correcting mistakes and errors, improving connectivity or interoperability by adopting open standards, learning new technologies, adopting more efficient or effective methods such as preparing graphics for display so that they look reasonable and download quickly. Where conflicts arise e.g., one aspect causes both positive and negative effects, candidates should be encouraged to discuss these and not simply take an accepted view on face value. There is a lot of disagreement about the relative merits of particular tools and methods. At

Evidence: Evidence from documented descriptions conforming to the criterion and guidance	this stage the main emphasis is on making judgements and at least attempting to justify them even if the candidate's level of knowledge is a limiting factor. One possible issue might be that what the candidate finds easy to use on a software application is very difficult for an end-user/client. Therefore, an alternative will need to be found and tested as it is the client's needs that are being catered for.
2.5 I can review outcomes to make sure they match requirements and are fit for purpose Based on describing strengths and weaknesses of outcomes in relation to their planned intentions, candidates should comment on how well they meet the requirements defined in their plans. **Evidence**: Evidence from third party feedback, analysis of strengths and weaknesses and any other relevant documented descriptions conforming to the criterion and guidance	• Candidates should show evidence that they can evaluate completed projects by documenting them appropriately, establishing clear links between planning, execution, and evaluation. The evaluation should start with the original aims or intentions, analyse strengths and weaknesses by comparing outcomes to planned intentions. The review should include the views of peers and/or the intended audience for their work. Assessors can provide guidance in the form of headings and ensure that review of outcomes provides the basis of describing ways for making improvements but candidates should provide descriptions of their judgements in their documentation accessible to the Account Manager. • This criterion is a reflective one where the students can write about their experience in relation to the design and its outcomes. They will have set some basic targets and objectives when they started the project or IT implementation, and now they can look at how close they were to meeting them. They do not have to meet everything perfectly and there is more learning in finding problems and planning to fix them at a later date than getting it right first time. The other key term here is “fit for purpose”. This term is much used in the popular press these days and students should be familiar with the meaning. In their own project, could they say that it was a competent job that solved a number of clear problems. If the target audience can’t really use it as planned, it is not fit for the purpose for which it was designed. The outcomes will tie in to this as something like a template for gathering data will need to gather the data expected. If it does not do this, or gathers data that is not useful, then this could be an example of being not fit for purpose.
3.1 I can review the benefits and drawbacks of productivity tools and systems used in terms of productivity and efficiency The candidate should be able to identify how IT tools might make achieving ICT based solutions more efficient to increase productivity for themselves and others. **Evidence**: Evidence of review through documentation of evaluation in web pages and/or day to day files.	• For example, sending e-mail can be more efficient than talking to someone when all that is required is a specific piece of information. Discussing the details of how to use a new software tool by e-mail or text messaging is likely to be a lot less efficient than a spoken conversation and so review should include discriminating use of ICT. Other factors such as the lack of expression and remoteness of technology can lead to "flame wars" that would reduce efficiency. • Information entered directly into a web page can be much more efficient than making a word-processed file and attaching it to the page. Firstly, there is no need for word processing software, secondly the information is immediately available to users without having to download a file and having software for opening and viewing it. Social networking can be very powerful, but it can also be a major distraction to the focus required for efficient working. • They might have discussed this in forums or verbally to form their views and so assessors might provide a witness statement to acknowledge this. • What are the benefits of the solutions you propose? What kinds of measures can you use to back up your claims? If your project is to create a template for a small local company to make them generate letters to customers more efficiently, have you looked at all possibilities. If the document requires several people to look at it before it is released, this means the document is printed and passed around, or emailed back and forth. This takes time and effort and is inefficient. How much better would it be to use a cloud based collaborative system so that all these people can work on the document and sign it off collectively. Some systems even have built in workflow systems with different sign off rights such as Alfresco.

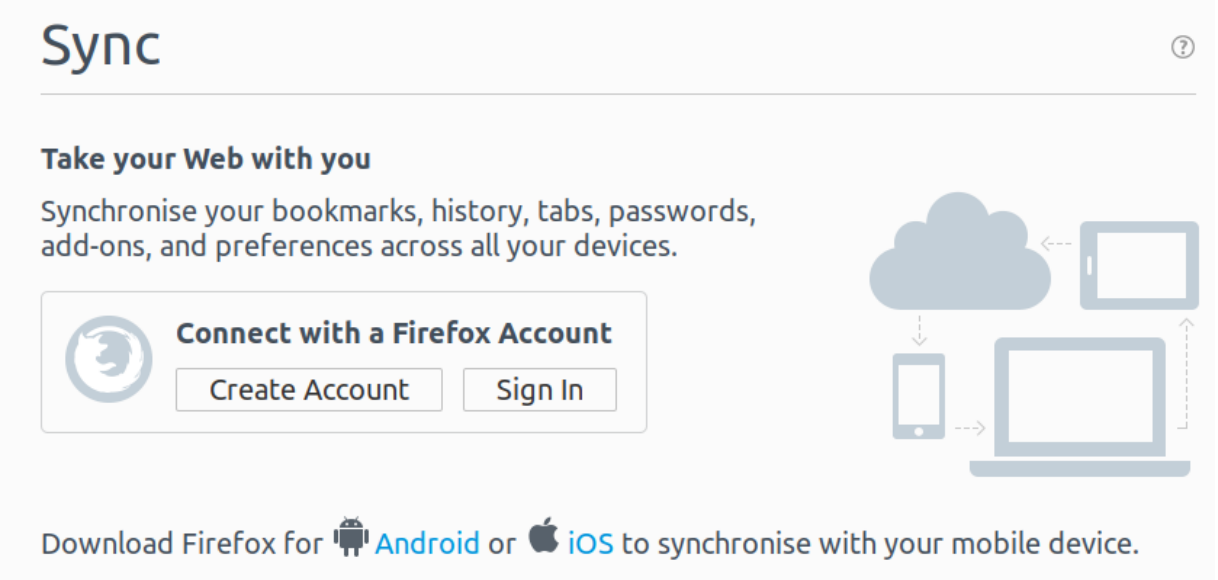


- The above image is from Alfresco, an open-source CMS (Content Management System) which allows groups to collaborate on documents and for different people to make changes and send it back or pass it forward. The whole process is tracked so that everyone can see how the document progressed and any hold ups.

  In some cases, it may be legitimate to say that IT does not help the process and causes too many distractions. If IT is used poorly, it is as bad as any other methods.

3.2 I can describe ways to improve productivity and efficiency

- Examples might be to use a typing tutor to improve keyboard efficiency, use of keyboard short cuts, recording a macro to automate a process or getting a web browser to save often used details like name and address. They might describe how they organise their folders so the most often needed files are most readily available or change user interface characteristics. They might use bookmarking for files - note for machines with

The candidate should provide evidence that they can describe examples of working methods that improve efficiency. **Evidence**: Evidence of descriptions through documentation in web pages and/or day to day files.	multiple users, bookmarking web sites are a clear advantage. They might use on-line collaborative tools instead of desktop tools or they might use shared resources such as open clip art and Wikipedia on the "Give a brick get a house" principle. Many browsers now have the ability to synchronise browsing and other settings across computers and devices which increases efficiency. 
3.3 I can develop solutions to improve my own productivity in using development The candidate should have adopted some of their own practical solutions for personal productivity as a result of exploring the ways that ICT can be used to communicate, collaborate and share ideas. **Evidence**: Evidence through documentation in web pages and/or day to day files of them changing the way they work in response to feedback, evaluation and review.	• They should have some clearly improved ways of working from regular use of keyboard short cuts, bookmarking useful sites, greater use of web pages instead of word processors to present and organise information. This should be witnessed by the assessor and/or supported by portfolio evidence. Candidates should be encouraged to discuss productivity with peers and share ideas about the most effective techniques, favourite short-cuts and working methods.
3.4 I can test solutions to check that they work as intended The candidate should routinely check their work to make sure they actually produce the outcome intended as their work progresses. **Evidence**: Evidence through documented evaluation.	• There should be few instances of bad formatting, spelling errors, or other obvious errors that could be eliminated by simple checks. Encourage groups to check and assess each other's work and to receive feedback graciously when others find errors. Fix errors directly or find out how to. • One final aspect of any IT work it to check that it does what it is supposed to. The best way for this is probably to devise a test plan and carry out the tests as methodically as possible. Building a basic table to store results also helps think about how to solve possible problems, as well as make the information easier to access, for example:

Number	Description	Expected Outcome	Actual Outcome	Actions to take
1	Shortcut key to paste highlighted words	Pastes the words with shortcut keys	Same as expected	No further action
2	Short-cut to reformats a section	Reformat a selected section	Reformatted other parts	Need more precision in selecting what needs to be formatted

Annexe B

Optional Units

The TLM Level 2 Certificate has a requirement of 16 overall credits to pass. Unit 1 is a mandatory unit, but the following are a small sample of possible optional units to complete.

Centres can pick units themselves as long as they make a minimum of 16 credits overall.

The units can be chosen to have an overall focus, for example units that are about office productivity or more creative design, or they can be something to match local industry needs, for example focussing on managing data such as spreadsheets and databases.

3 Optional Units are included below as reference to centres in relation to how much evidence is required from learners.

Level 2 Unit 2: Fundamentals of Coding and Development (4 credits)

1. Setup and work with a professional development environment	**2. Understand algorithms and key features of coding**	**3. Implementing Object-Oriented Programming**	**4. Implementing a professional workflow with best practice**
1.1 I can use command-line interface to navigate through systems	**2.1** I can use common coding structures and features	**3.1** I can describe what object-oriented programming is	**4.1** I can understand what is meant by source control
1.2 I can configure a development environment	**2.2** I can demonstrate complex algorithms.	**3.2** I can use classes and objects to structure new applications	**4.2** I can demonstrate ability to use a version control platform
1.3 I can install development tools	**2.3** I describe the difference between compiled and interpreted code	**3.3** I can develop apps using object-oriented programming	**4.3** I can create documentation for your code solutions
1.4 I can integrate external tools into a workflow	**2.4** I can explain the relationship between data and methods in code	**3.4** I can explain key principles of OOP; encapsulation, abstraction, polymorphism and inheritance	**4.4** I can modify development environment settings for a personalised experience
1.5 I can describe the usefulness of extensions in a modern development environment.	**2.5** I can understand common technical design principles	**3.5** I can create a program design using UML	**4.5** I can take part in a code review and project retrospective

Level 2 Unit 3: Developing Mobile Apps (4 credits)

1. Understanding the principles of mobile app development	2. Developing apps for mobile devices and platforms	3. Exploring the features available in a mobile SDK	4. Developing Mobile Apps Project
1.1 I can describe difference between native apps, cross-platform apps and progressive websites	**2.1** I can explore architecture of a modern mobile app	**3.1** I can describe typical features in a mobile SDK	**4.1** I can create a technical design for a given scenario
1.2 I can work with a software development kit	**2.2** I can use a programming language with a mobile framework	**3.2** I can implement two SDK features in an app	**4.2** I can utilise professional practice including source control and documentation
1.3 I can set up environment to include the tools needed to develop for a mobile platform	**2.3** I describe launch a demo app in a mobile device emulator or simulator	**3.3** I can develop a user interface with code	**4.3** I can develop a mobile app that spans across different screen sizes on the chosen platform
1.4 I can understand the mobile ecosystem	**2.4** I can create an app that takes advantage of key features of a mobile platform	**3.4** I can compare features of a native development SDK and a cross-platform SDK	**4.4** I can describe the importance of testing of a mobile app before launching it
1.5 I can describe demonstrate awareness of scope of mobile devices.	**2.5** I can deploy app to a mobile device	**3.5** I can utilise plugins in mobile apps	**4.5** I can explore how apps are deployed onto the iOS App Store and Google Play

Level 2 Unit 4: Creating Connected Apps (credits)

1. Architecture of Internet-enabled apps	**2.Create an Internet-connected app**	**3. Implementing cloud-services into apps**	**4.Creating Connected Apps Project**
1.1 I can describe the possibilities and opportunities of Internet-connected apps	**2.1** I can create a location-tracking app using the SDK or plugin	**3.1** I can describe what is meant by cloud services	**4.1** I can develop an Internet-connected mobile app for a provided scenario
1.2 I can explore how back-end and server-side applications are developed	**2.2** I can describe what an API is used for	**3.2** I can use a cloud service platform like Firebase to power a mobile app	**4.2** I can implement effective professional practice techniques during development
1.3 I can identify features of an SDK that rely on the Internet to function	**2.3** I describe create an app that uses an external API to provide data	**3.3** I can implement push notifications into an app	**4.3** I can produce documented, efficient code
			4.4 I can deliver a presentation highlighting the development process