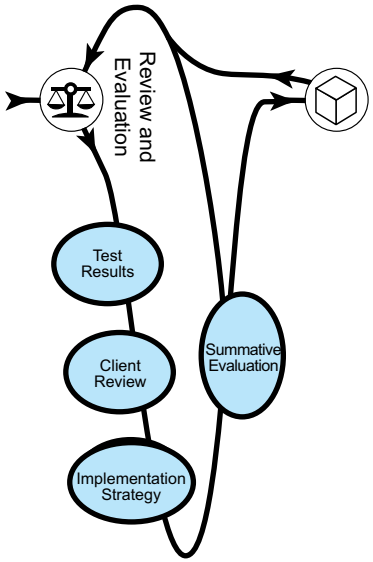
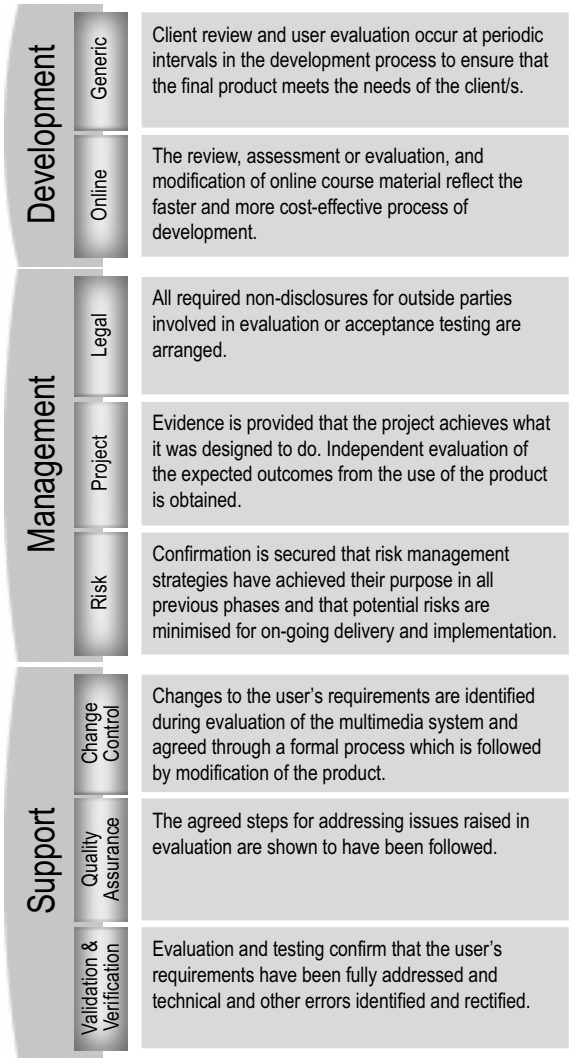
Review & Evaluation



		Initiation	Specifications	Design	Production	Review and Evaluation	Delivery and Implementation
Development	Generic	The overall strategy for product development is determined by the initiation of ideas for MM projects which may come from a variety of sources, the client's expectations and budget.	Detailed specifications are derived from the client's expectations, the user's requirements and the capability of the production unit or organisation.	The design solution identifies the key components, and relationships between, the technical, interface and educational requirements reflecting the primary purpose of communicating effectively with the end user.	Production of quality MM requires the utilisation of development environments and media integration strategies linked to the specifications and design solution.	Client review and user evaluation occurs at periodic intervals in the development process, and ensures that the final product meets the needs of the client/s.	Delivery and commissioning processes outlined at the planning stage are implemented.
	Online	Providing on-demand access to interactive education/training requires a documented account of not only hardware, software and bandwidth, but also the requirements of the user.	Course design for online delivery focuses on the objectives to be achieved and not on the means of achieving them, necessitating a shift in the instructional design paradigm.		Delivering course material online requires knowledge and understanding of technical issues so that the end user is not impeded by the limitations of the medium.	The review, assessment or evaluation, and modification of online course material reflect the faster and more cost-effective process of development.	Once the course is operational, on-going management and maintenance strategies are implemented to ensure currency, correctness and applicability.
Management	Legal	Costs associated with copyright and rights negotiations need to be incorporated into the budget to ensure that legal complications do not jeopardise the project financially.	The diversity of inputs to multimedia means that there are more rights involved and therefore more clearances to obtain for both production and/or delivery of	Endeavour to incorporate a significant proportion of original material in online resources, and that linked materials are attributed to the respective authors.	All copyright restrictions and encumbrances are resolved before production commences.	All required non-disclosures for outside parties involved in evaluation or acceptance testing are arranged.	Confirm that all licencing agreements have been finalised and that liability and insurance coverage has been arranged for the delivery of the product.
	Project	Project scope and contract requirements are reviewed. The client is briefed on change control procedures, review and approval procedures, and confirms the	Stated and implied needs of the client are matched with appropriate development methods, tools and skilled resources to supply a quality product.	A global overview of the project is derived once revisions of cost estimates, schedules, team participants and other matters are conducted in accordance with the concept brief and the detailed design	Each skill group, such as graphic artists, animators, programmers, goes about their tasks with appropriate guidance/support from the project manager.	Evidence is provided that the project achieves what it was designed to do. Independent evaluation of the expected outcomes from the use of the product is obtained.	Provide the handling, storage, packaging, preservation, and delivery mechanism to guarantee the product is shipped as built. Release notes and instructions for installation and setup are provided.
	Risk	The scope of the risk management (business, technical and project risks) to be performed is identified.	Potential risks are identified, analysed and assessed, and mitigation strategies, metrics and corrective actions outlined.	Identified risks are quantified and qualified and corrective strategies are validated.	Mitigation strategies and error trapping techniques are employed to reduce the impact of technical risks and risks associated with interface complexity and creativity.	Confirmation is secured that risk management strategies have achieved their purpose in all previous phases and that potential risks are minimised for on-going delivery and implementation.	Strategies to reduce technical risks from version control, documentation development, and pre-testing will be employed.
Support	Change Control	The project deliverables and their associated supporting documents, are identified, presentation standards are defined and change procedures established.	A baseline for the user's requirements for the system is established and defined, and changes to the baseline are agreed through a formal process.	The design solution is traceable to the requirements baseline, and agreed changes are reflected in both.	The integrity and consistency of the developed system is ensured through the enforcement of agreed standards and control of change.	Changes to the user's requirements are identified during evaluation of the multimedia system and agreed through a formal process which is followed by modification of the product.	The configuration for the developed multimedia product to be implemented and distributed is defined and agreed, and placed under formal controls.
	Quality Assurance	Planning for the project assures key sponsors that the plans, procedures and standards outlined will be followed, and that the work products will meet the requirements for quality.	The QA group will confirm that the specification of user requirements has been reviewed for completeness and feasibility, and that any issues previously raised have been addressed.	Confidence is established that the design solution accurately reflects the user's requirements, and that the agreed standards are followed.	The developed system will be shown to be derived from the agreed design using defined actions and agreed standards.	The agreed steps for addressing issues raised in evaluation are shown to have been followed.	The planned tasks for implementing and distributing the final product will be shown to have been followed.
	Validation & Verification	A strategy, including tools, techniques and activities, is defined for determining whether each work product functions correctly and meets the user's requirements for the product.	Criteria for verifying the system specification, and for demonstrating that the requirements have been satisfied, will be defined and applied.	The correctness and appropriateness of the design solution will be demonstrated through a process of design review.	The developed system and its components will be shown to be a robust and accurate reflection of the user's requirements.	Evaluation and testing confirm that the user's requirements have been fully addressed and technical and other errors identified and rectified.	Verify that the implementation criteria have been fully adressed and that the product meets the client's and/or end user's requirements in an opertional environment.

REVIEW AND EVALUATION



Overview of the Phase

Review and evaluation are crucial aspects of multimedia development, and occur throughout the iterative development process rather than just at the end. At the end of each cycle of conceptualise, specify, design and produce, the product is critically examined before starting the next iteration. These processes ensure that content and the flow of interaction remain true to the original concept, that programming, for example, supports correct responses and timing and that the product meets the client/s' needs.

The major functions of evaluation can include: review, needs assessment, formative evaluation, effectiveness evaluation, impact evaluation and maintenance evaluation. Each of these inform the various phases of development, to a greater or lesser extent.

Formative evaluation involves the systematic collection of information at designated points in the development process. Results of alpha and beta field tests can inform content, contextual and design decisions. Summative or effectiveness evaluation, which is conducted in a more controlled environment, provides evidence that the project has achieved its intentions.

Any changes to the product are agreed to by the client and the development team.

Key Features

- The Review and Evaluation Plan is reviewed to ensure that the usability tests and evaluation techniques are appropriate.
- A completion date for testing and evaluation is determined.
- The delivery platform is confirmed with the client so that testing and evaluation can occur in the 'field'. If the product will be delivered in a number of different environments test on as many platforms as possible.
- Consider the use of impact evaluation (transfer of learning). While it is not usually a function of the development group, results can provide useful data for future design and development of education/training products.
- Maintenance evaluation is conducted to examine the viability of an online interactive learning system over time.
- The sample audience(s), which is representative of the target group, is selected.
- Sufficient time and resources are allocated to accomplish the final revision.

Review and Evaluation

Client review and user evaluation occur at periodic intervals in the development process to ensure that the final product meets the needs of the client/s.

Description

With its capabilities of integrating a diverse array of media and instructional strategies, multimedia also poses unique formative evaluation questions for its improvement.

The purpose of the on-going evaluation and final product review is to: guide the design process as well as assess the interface; detect usability problems; determine to what extent the product is cost effective, interactive, of high instructional quality, visually appealing; and achieves the specified learning outcomes. At all points in the process the results of evaluation are documented.

Once all the problems/changes are identified, they are prioritised for resolution. Identification of problems according to categories may assist in solving related problems.

If the system has to be thoroughly reworked, it leads to a revision plan and the start of a new cycle.

Tasks

Review the Evaluation Plan

A joint review of the Evaluation Plan by the client and developer should be conducted to confirm agreement on how decisions about changes will be made, the methods for collecting data, the composition of the sample(s) and the evaluation instruments to be used.

Select appropriate personnel for particular roles

Confirm the personnel responsible for fixing identified bugs and problems. In consultation with the client select groups of end users who will provide feedback on the functionality and performance of the product. Another group of testers may be highly expert multimedia developers not connected with the project who can provide peer review on the multimedia elements and their integration.

Perform user testing in accordance with the Evaluation Plan

User testing requires the end user to check for consistency in the interface, to review the content in terms of correctness, presentation of material, ease of navigation, cognitive load and to locate functional and performance errors.

Collect, collate and resolve issues

Analyse, summarise and organise the testing and evaluation results into a formal report for review and action. If questions arise about the effectiveness of the product before or after implementation, comprehensive evaluation reports will provide the best source of answers.

Review and Evaluation

The review, assessment or evaluation, and modification of online course material reflect the faster and more cost-effective process of development.

Description

Online course material can be evaluated according to criteria such as source, content, structure, design and access. In addition, the evaluation can consider such management features as the creation of individual configuration files for end users, based on information entered before commencing the course. While it may be difficult to completely bypass, the evaluation design should centre on the courseware, the end users and the learning outcomes to be achieved, rather than the technology.

Testing the course for usability is a less complex task than evaluating the users' response to the content. Highlighted problems can be easily rectified especially if an 'audit tracking program' determines the pathways taken by testers through the material.

Consider less formal methods of evaluation for early iterations of the product and move to more formal methods as the product matures.

Tasks

Evaluate the online material

Develop evaluation criteria: What should an Internet resource provide; how is the material organised; what links are there to related concepts, to resources such as journals, to other multimedia resources.

Test the usability of the online product on as many platforms as possible as performance depends on the end user's hardware and software configurations.

Obtain and analyse feedback

Develop online feedback forms which can be returned by the web browser or email. Consider the advantages and disadvantages of the various types of feedback mechanisms. Two examples are: Audit or tracking files: Logged data provides vast amounts of information which can be expensive to analyse, yet it is a valuable tool in identifying problem areas for users.

Questionnaires/surveys: It is difficult to isolate specific problem areas from general questions and questions can be interpreted a number of ways.

Consider independent evaluations

Consider bringing external evaluators into the process in order to broaden the evaluation and possibly to gain a different perspective.

Review and Evaluation

All required non-disclosures for outside parties involved in evaluation or acceptance testing are arranged.

Description

Before any deliverables from the project are reviewed by people external to the project, the Project Manager must ensure that prescribed confidentiality and non-disclosure agreements have been signed.

Where access is provided electronically, additional safeguards such as firewall protection, and passwords, and other access controls may be required.

Many clients need to be convinced that time should be allocated to reviews of the instructional/ educational design or subject matter expert material during the course of development. On completion of the project, the training offered should be validated whenever possible. In addition, the diversity of testing procedures and the range of possible test subjects can make review and evaluation a long and complex process. If testing goes on for too long, the client might refer to a section of the agreement to terminate the contract for noncompliance.

Tasks

Identify parties involved in Review and Evaluation

In collaboration with the client, the Project Manager identifies all individuals and organisations involved in Review and Evaluation activities. Contact details and references are retained in the project filing system.

Arrange confidentiality and non-disclosure agreements

For all non-project personnel involved in Review and Evaluation, the Project Manager should arrange prescribed confidentiality and non-disclosure agreements before access is permitted.

Provide secure electronic access to system

Where access is required electronically, the Project Manager should arrange secure access to the system for authorised external parties.

Review and Evaluation

Evidence is provided that the project achieves what it was designed to do. Independent evaluation of the expected outcomes from the use of the product is obtained.

Description

The quality assurance and quality control records provide examples of how correct the products were. Client acceptance of the work products and project results are examples of satisfactory completion.

For multimedia products, independent verification and validation of the intended outcomes from product use are required.

Corrective actions and temporary work-arounds may be required before formal acceptance from the client is received.

Administrative closure of the project will normally commence at this stage.

Tasks

Perform scope verification

Review all work products and results to ensure that all were completed correctly and to the satisfaction of the client. Keep records of the reviews and acceptance by the client.

Perform quality assurance and control

Use the mandatory quality attributes in the quality agreement to assure and control the review activities in the project and keep records of those activities.

Perform independent Verification and Validation

Acquire resources (sub-contract) and perform independent V&V of work products and results. Arrange for confidentiality or non-disclosure agreements. Resolve and report on any corrective actions or anomalies from these activities.

Evaluate multimedia product

Evaluate the multimedia product against the planned product outcomes. Resolve and report on any corrective actions or anomalies from these activities.

Perform corrective actions

Perform any corrective actions required to address issues found from V&V activities.

Provide temporary workaround

Provide documented temporary work-arounds as appropriate to maintain operation of the system until a permanent solution to a problem can be found.

Record evaluation results

Record and distribute records of the evaluation results to those who need to know.

Perform administration closure

After achieving the project objectives, or after contract termination for other reasons, commence administration close-out. Collect project records of final specifications and results to formalise the commencement of the client acceptance process.

Review and Evaluation

Confirmation is secured that risk management strategies have achieved their purpose in all previous phases and that potential risks are minimised for on-going delivery and implementation.

Description

The objective for effective review and evaluation is to locate and repair faults in the multimedia product, identify error-prone assets, and to complete the evaluation and review on schedule with sufficient faults found and fixed so that the multimedia product will operate 'well enough' when delivered. Elements within this phase operate throughout the project as testing and evaluation focuses not only on the product usability but also on determining whether the content achieves specified educational/training outcomes.

During this evaluation and review, all assets are integrated into a cohesive whole and a series of tests and evaluations are performed. The overall product is evaluated to validate that the learning outcomes, the functionality required, and the dynamic characteristics of the system match those required by the client.

If tracked defects are concentrated in one or more assets, it indicates that the requirements may not be well understood, or that the design is not suitable.

Tasks

Record defects (errors, problems, issues, achievement of outcomes)

Correctness measures are used to determine release readiness of the product and to estimate when the product will be ready for release. If that time is significantly after the scheduled time, then the risk is high. The measure, 'correctness', is defined as the extent to which the components meet requirements. Errors are logged so that a cumulative error distribution can be used to show the rate of finding errors. Correctness is reported as the number of errors found, and the expected total number of errors.

Correctness measures are collected as follows:

Date detected
Date closed
Criticality of defect
Test ID or Number
Origin of defect
Assets affected by closure

Time to fix errors can be tracked and monitored. If it is increasing, then a threat to correctness, and the schedule exists.

Analyse defects

Cumulative error distribution over time, errors by criticality category, time to fix errors, and location of defects causing highly critical errors are analysed.

Report risk status

At planned review meetings or when required, present status of risk analyses and assessment.

Prepare for product release

Use the measures and their analysis to provide an expected release readiness date and advise client.

Review and Evaluation

Changes to the user's requirements are identified during evaluation of the multimedia system and agreed through a formal process which is followed by modification of the product.

Description

The Review and Evaluation phase provides formative and summative reviews of approved prototype/s, usually with typical end users. The concerns of change control are with ensuring the integrity of the system releases to the evaluation environment, and with reviewing the feedback received from the evaluation.

When a system is released for evaluation, a policy must be determined as to how to control distribution. Options range from strict controls under a contractual arrangement, to open distribution using an unrestricted mechanism such as the Internet. Strengths and weaknesses are associated with any approach, which must be evaluated in the light of the overall project goals.

During the Review and Evaluation phase, proposals for changes to the requirements will emerge from a consideration of the user feedback. These proposals must be assessed for impact and approved following the formal change management procedures.

Tasks

Define system baseline for review and evaluation

The composition of the system to be released must be fully defined, and copies of the system stored securely to provide a firm reference point for the evaluation. Where possible, the evaluation baseline should be a complete system, in the same format as proposed for final implementation. The composition of the release baseline should be documented, and the configuration report also securely stored.

Define procedures for delivery of review system

A number of strategic decisions have to be made in preparation for the Review and Evaluation phase. The scope of the evaluation, and particularly the identification of the group to perform the evaluation, needs to be determined, and procedures put in place to ensure that the decisions are effectively implemented. These decisions will impact on the change control mechanisms required for the phase.

Mechanisms for system delivery will also vary according to the evaluation strategy. Small group evaluation can be managed by conventional distribution mechanisms; large scale field testing, however, will almost certainly require some form of Internet-based circulation, with the accompanying infrastructure requirements.

Evaluate change requests from review and evaluation

Feedback reports from evaluation will generally fall into two categories: problems/defect reports, and requests for change. A feedback response procedure needs to be put into place; a key element should be the distinction between these two classes. Feedback that constitutes a request for change in the system should be treated as a change in the requirements, and processed through the formal change control mechanism.

Implement approved changes in review baseline

Modifications to the released system have to be performed in a controlled manner. Multiple rapid releases of the product are indicative of poor control over the baseline, and potentially of a product that was not ready for release, even for evaluation.

Review and Evaluation

The agreed steps for addressing issues raised in evaluation are shown to have been followed.

Description

The concern of the QA group during the review and evaluation phase is to confirm that the agreed principles for addressing issues are properly addressed.

Confirmation is sought that proper procedures have been followed for the distribution of the products to the evaluation environment, and that proper arrangements have been made for the receipt and processing of issue and problem reports. In order to achieve this, the QA group reviews the configuration details, to assure the integrity of the distributed products. The receipt of user feedback is examined to ensure that the defined procedures have been implemented and enforced.

The process for evaluating and acting on user feedback should be reviewed, examined for their effectiveness, and the operation of the process studied to ensure that the defined procedures are followed. Finally, assurance should be obtained, by auditing the problem resolution, that the feedback is being effectively used.

Tasks

Define audit criteria for Review and Evaluation

The QA function is primarily interested in two aspects of the Review and Evaluation phase: Are the products released subject to adequate controls to ensure their integrity? And are the feedback comments received from evaluation properly addressed and incorporated into revisions of the system?

In order to address these issues, reviews and audits focus, firstly, on the configuration management procedures; and then, on the process for problem management.

Confirm configuration of products released for review

The QA group confirms that the product released for evaluation is in fact the correct configuration of the developed system, and that changes in the baseline have been correctly implemented. The distribution mechanism is examined to confirm that it meets its objectives.

Review management of user feedback

The QA group should confirm that feedback received from users involved in product evaluation is correctly received, analysed, prioritised and corrections to the system made as required. The discrimination of problem reports from change requests should be confirmed, and evidence sought that both classes of feedback are addressed in an appropriate manner.

Identify and implement appropriate corrective actions

Recommendations for changes to correct deficiencies in procedures for product release; user registration; and management of feedback may be made as a result of quality assurance actions. In subsequent reviews and audits, the QA group should confirm that these corrective actions have in fact been addressed and effectively implemented, and that the problems that led to the proposed corrections have now been resolved.

Review and Evaluation

Evaluation and testing confirm that the user's requirements have been fully addressed and technical and other errors identified and rectified.

Description

This phase is primarily concerned with validation of the developed system to confirm that the perceived solution, arrived at through a process of prototyping with a target user group, is an acceptable solution to the needs of the wider user community.

Mechanisms may range from a normal beta release strategy - where the new product is made available through a relatively uncontrolled mechanism - to the use of advanced 'operational prototyping' approaches, where solutions to user problems are addressed 'on the spot', and later incorporated into the production system.

The success of the Evaluation phase is also dependent upon having defined criteria that are to be evaluated. Without this, there are no established priorities for rework, so that the results of validation may not be adequately addressed.

Tasks

Define and review the criteria for Review and Evaluation

The first activity for V&V is to draft criteria for the users to apply in their evaluation - summarising the intended purpose of the system, and identifying key characteristics on which feedback is sought. Specifically, the focus in evaluation should be on how well the system meets its learning objectives.

Establish a problem and issue reporting system for user comments

An effective system has to be established for receipt and management of all user feedback which is linked to some form of user registration for the evaluation, preferably clearly identifying the user and the release of the system being evaluated.

It should be possible to identify instances where several users report the same problem or deficiency - not an uncommon occurrence!

Prioritise, evaluate and resolve user comments

The reporting system supports the analysis of user feedback; however, it is the responsibility of the project team to undertake this analysis, and to identify and implement the necessary changes to the system. The reports are analysed. Each category of report can then be evaluated in terms of its severity; priority for addressing; impact on acceptance of the system; and effort required to address.

Validate proposed resolutions against original requirements

Evaluation of the system by potential users should not be undertaken without consideration of the original client requirements. It you are developing an education/training system, and the user feedback says that it should be converted into a game, this conflicts with the client's goals, and probably indicates that the target user group has been poorly selected or briefed. The resolutions of user feedback therefore need to be validated against the client's original goals, and any radical changes in the requirements should be undertaken only after close consultation with the client.

Work Products

User Register

A register of users participating in the Review and Evaluation phase should be maintained, to allow for tracing of reports and control of the released system.

Confidentiality and Non-disclosure Agreement (NDA)

If the product contains instructional design strategies or navigation activities which are innovative, for example, then it is essential that all testers and/or evaluators of the product have signed an NDA before commencement of any activity.

Test Results

Records the results of tests and evaluations, including problems and anomalies.

Client Acceptance Authority

This may be a standard letter or a more formal document. It records the receipt of delivery and identifies the date received, the items delivered, and records the verification of any defined customer acceptance criteria. It is signed by the client.

Risk Management Report

Use a risk depiction method agreed to present risk assessment to the project team and the client.

End User Evaluation Reports

These document the results of testing and evaluation activities and usually require actioning.

Product Documentation

The level of details provided will depend on the end user environment, the requirements of the client and the complexity of the product.

Questions to Confirm this Phase

Are the correct versions of all the components of the version of the system released for review and evaluation able to be identified?

Is a secure copy of the released version of the system held away from the development site?

Are there defined procedures for distribution of the system to evaluators?

Can system evaluators register online or by other means?

Are all test and measurement instruments available?

Is there a system in place for receiving and evaluating user comments during review and evaluation?

Have all comments received been analysed and problem reports or change requests raised as required?

Have audits of the review and evaluation activities been conducted?

Are problems found during review and evaluation recorded and tracked to resolution?

Are change requests raised as a result of review and evaluation processed through the agreed procedure?

Are product evaluation standards (utility, feasibility, propriety and accuracy) being used?

Has testing been done under every possible condition?

Has multimedia content been optimised for quality user experience and high performance?

Does required user response match skills of target audience?

Is online response time adequate?

Has the WWW been used effectively to deliver the instruction?

Is the product working on a targeted delivery platform?

Is sufficient documentation provided and easy to use?

Does the product meet the identified learning needs of the targeted group and achieve the learning outcomes?

Is the client ready to accept the product?

NOTES