

Online Content Development Processes

A White Paper by

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Abstract

As a younger workforce moves in, one challenge for organizations is providing fresh and updated content to learners using the latest information and communications technology. Today's online learners have very different expectations than their predecessors of even a few years ago, and will have a tendency to rapidly lose interest depending on their age and personal experience. An expectation for courses that are well designed, engaging, and interactive is now the norm. At the same time, it is important to note that novice learners have different needs than expert learners. Novice learners prefer to be told where to click while following an online course whereas expert learners like to find their way around a course on their own. Because of this, organizations need to be aware of change management issues and prepare their employees to face and adapt to these changes. One approach is to use a flexible learning management system to present the same materials in a variety of different ways to accommodate as many learners as possible.

The purpose of this document is to clearly define the workflow that organizations must follow for creating effective online content for their users, from the initial preparation process to the final implementation phase where the online content is ready for use. Crucial decisions must be taken throughout the entire process for successful results.

Brief Overview of the Process

The online content development process is composed of 6 different stages.

1. Preparation

This initial stage indicates the workflow to follow for an organization preparing its first online content development project.

2. Evaluation

In this stage, the requirements for online content development are analyzed to determine if the needs meet the criteria for converting instructor led training (ILT) courses to online courses, or, to determine if a brand new online course needs to be developed.

3. Instructional Design

In this stage, an Instructional Designer (ID) develops a project management plan and a storyboard for the course.

4. Graphic Design

In this stage, an appropriate design template is chosen. If no appropriate template exists, a new one is created and tested.

5. Development

In this stage, a web developer uses authoring tools to create and assemble the modules of the course.

6. Implementation

In this final stage, the content is installed in its final IT environment and is made available to users.

The Online Content Development Process

1. Preparation Phase

If an organization is not on its first content development project, it can pass directly to the Evaluation phase. Otherwise, the first step for producing materials is to set up and equip the team who will produce the online content. This team will need to understand the business priorities for online training projects; that is, what are the organizational goals of learning?

Online training courses require a secure and robust IT infrastructure that will support their deployment. If it doesn't already exist, an appropriate IT infrastructure must be set up or the existing one must be analyzed to make sure it can accommodate online content.

Hiring the right mix of talent for producing online training materials is also critical, as a typical production can require a large number of skill sets. Figure 1 below outlines the many roles that may be required to produce rich online multimedia experiences. Individual staff members may be able to fill multiple roles, but it is difficult to find all these abilities in a single person.

If the production team that is set up is to service multiple groups within an organization or is to provide external services, then a communications plan and marketing materials will need to be created. It is also a good idea to set up a website that allows requests to be made for custom course development, using online forms.

However, if all of the above has been set up, and the team is experienced, then the online content development process starts with the next phase -- Evaluation.

Figure 1 - TEAM ROLES IN ONLINE COURSE DEVELOPMENT

Making appealing educational material for the Web is an exercise in both instructional design and in producing Web-based multimedia. Depending on the scope and content of the project, over 20 discrete roles may be needed to produce effective online courses (of course, the same person may fill several roles). These roles may include:

1. Executive Producer/Project Sponsor
2. Producer/Project Manager
3. Quality Assurance Expert
4. Creative Director/Multimedia Designer
5. Art Director/Visual Designer
6. Artist
7. Interface Designer
8. Usability Specialist/Human Factors Expert
9. Game Designer
10. Subject Matter Expert/Content Writer
11. Assessment Specialist
12. Instructional Designer/Training Specialist
13. Script Writer/Storyboard Designer
14. Animator (2D/3D)
15. Sound Producer
16. Music Composer
17. Video Producer
18. Multimedia Programmer
19. HTML Coder/Programmer
20. Lawyer/Media Acquisition Specialist/Rights Clearance Specialist
21. Marketing Director/Marketers

(adapted from Vaughan, 2001)

The team that performs the above roles needs to work together. While there is a tendency to have a “lone wolf” Web developer try to do the whole job, Vaughan (2001) issues the following warning: “A multimedia expert working alone will be hard-pressed to compete with a team of experts and may be overwhelmed by the sheer amount of effort required to build a complex project single-handedly.” (p. 33)

2. Evaluation Phase

The first step of the Evaluation Phase occurs when an internal or external client makes a request for services. This request should be followed by a questionnaire or interview(s) with the primary stakeholder(s), in order to develop a general requirements document.

At this stage, it is necessary to determine if this request is for the conversion on an existing instructor led course, or whether a new course needs to be developed. If the request is for online conversion of an existing classroom course, then the first step is to evaluate if it is suitable for development, according to preset criteria. If the request does not meet the criteria for conversion to online content, the request must be declined. However, if existing ILT course meets the criteria, legacy materials from the current instructor should be gathered, analyzed and evaluated.

Whether it is a new course, or a conversion of an ILT course, the next crucial step of this phase is to develop educational objectives for the course. One approach is to use Benjamin Bloom classification of levels of educational objectives (often called “Bloom’s Taxonomy”).

In 1956, Benjamin Bloom and his colleagues developed a classification of levels of educational objectives. This taxonomy contained three overlapping domains: the cognitive, psychomotor, and affective. Within the cognitive domain, six levels were identified: knowledge, comprehension, application, analysis, synthesis, and evaluation. These domains and levels are still useful today in developing critical thinking skills of learners. Critical thinking involves logical thinking and reasoning including skills such as comparison, classification, sequencing, cause/effect, patterning, webbing, analogies, deductive and inductive reasoning, forecasting, planning, hypothesizing, and critiquing.

The key to understanding Bloom’s Taxonomy is that the six levels are evaluated by the types of questions that are asked. Here are the six levels, and the kinds of questions that can be asked to evaluate learning at each level:

- **Knowledge**
 - remembering
 - memorizing
 - recognizing
 - recalling identification
 - recall of information
 - Who, what, when, where, how...?
- **Comprehension**
 - interpreting
 - translating from one medium to another
 - describing in one's own words
 - organization and selection of facts and ideas
 - Can you write in your own words...?
 - Can you write a brief outline...?

- What do you think could have happened next...?
 - Who do you think...?
 - What was the main idea...?
 - Who was the key character...?
 - Can you distinguish between...?
 - What differences exist between...?
 - Can you provide an example of what you mean...?
 - Can you provide a definition for...?
- **Application**
 - problem solving
 - applying information to produce some result
 - use of facts, rules and principles
 - How is...an example of...?
 - How is...related to...?
 - Why is...significant?
- **Analysis**
 - subdividing something to show how it is put together
 - finding the underlying structure of a communication
 - identifying motives
 - separation of a whole into component parts
 - What are the parts or features of...?
 - Classify...according to...
 - Outline/diagram...
 - How does...compare/contrast with...?
 - What evidence can you list for...?
- **Synthesis**
 - creating a unique, original product that may be in verbal form or may be a physical object
 - combination of ideas to form a new whole
 - What would you predict/infer from...?
 - What ideas can you add to...?
 - How would you create/design a new...?
 - What might happen if you combined...?
 - What solutions would you suggest for...?
- **Evaluation**
 - making value decisions about issues
 - resolving controversies or differences of opinion
 - development of opinions, judgments or decisions
 - Do you agree...?
 - What do you think about...?
 - What is the most important...?
 - Place the following in order of priority...
 - How would you decide about...?
 - What criteria would you use to assess...?

Another approach to evaluating training is based on Donald Kirkpatrick's work on training evaluation. It is based on levels of learning outcomes and is currently the most widely used evaluation approach in training. It is simple, flexible and complete using a four level approach. Recently, a fifth level emphasizing return on training investment (ROI) has been added by Jack Phillips:

<p>Reaction/ Satisfaction:</p> <p>Level 1 (Kirkpatrick)</p> <p>Did they like it?</p>	<p>Evaluate Reaction: Are people happy with the training inputs?</p> <p>An assessment used to determine the satisfaction level with a learning or assessment experience. These assessments are often known as Level 1 evaluations based on Dr. Donald Kirkpatrick's model. Course satisfaction evaluations (sometimes referred to as smile or happy sheets) are completed at the end of a learning or certification experience.</p> <p>Questionnaires are the most common collection tool. Obtain reaction to content, methods, media, trainer style, facilities, & course materials.</p>
<p>Learning</p> <p>Level 2 (Kirkpatrick)</p> <p>Did they learn?</p>	<p>Evaluate Learning: What do people remember from the training session?</p> <p>For this measure to be meaningful, it represents a summative evaluation that validates that learners have met the criterion objectives of the training program. Learning is change in knowledge, skills and attitude. Can be measured by interview, surveys, tests (pre-/post-), observations, and combinations of these.</p>
<p>Behavior / Transfer of Learning</p> <p>Level 3 (Kirkpatrick)</p> <p>Did they use it?</p>	<p>Evaluate Behavior: Do people use what they know at work?</p> <p>Behavior is a measure of the transfer of knowledge, skills and/or attitude to the real world. It is a measure of achievement of performance objectives. Behavior evaluation is the extent of applied learning back on the job. Observe the behavior; survey key people who observe the performer; use checklists, questionnaires, interview or a combination of these.</p> <p>The benefits to conducting Level Three evaluations are: (1) an indication of the 'time to job impact; (2) an indication of the types of job impacts occurring (cost, quality, time, productivity)</p>
<p>Work Results</p> <p>Level 4 (Kirkpatrick)</p> <p>Did it impact the bottom line?</p>	<p>Evaluate Results: What are the outcomes of applications on the job over a period of time?</p> <p>Results evaluation is the effect on the business or environment by the trainee. Measures must already be in place via normal management systems and reporting. The challenge is to relate influence of the trainee(s) to these base measures. Assess the "bottom line" or final results. The</p>

	<p>concept of "results" depends upon the goal of the training program. Proof is concrete, evidence is soft. Use control group; allow time for results to be realized; measure before and after the program; consider cost versus benefits.</p> <p>The type of business impact data that can be measured are the following: <u>Sales training</u>: Measure change in sales volume, customer retention, length of sales cycle, profitability on each sale after the training program has been implemented. <u>Technical training</u>: Measure reduction in calls to the help desk; reduced time to complete reports, forms, or tasks; or improved use of software or systems. <u>Quality training</u>: Measure a reduction in number of defects. <u>Safety training</u>: Measure reduction in number or severity of accidents. <u>Management training</u>: Measure increase in engagement levels of direct-reports</p> <p>The advantages to a Level Four evaluation are as follows: (1) determine bottom line impact of training; (2) tie business objectives and goals to training</p>
<p>ROI</p> <p>Level 5 (Phillips)</p> <p>What is the return on training investment?</p>	<p>Evaluate Financial Value: What is the impact of training on the bottom-line financials?</p> <p>Jack Phillips' Five Level ROI Model Source: "Measuring the Return on Investment in Training and Development Certification Materials", Jack J. Phillips, PhD (2002).</p> <p>The methodology is a comprehensive approach to training measurement. It begins with planning the project (referred to by Dr. Phillips as an Impact Study). It moves into the tools and techniques to collect data analyze the data and finally report the data. The end result is not only a Level 5 ROI but also measurements on the Kirkpatrick 4 Levels as well. This yields a balanced scorecard approach to the measurement exercise.</p>

After the educational objectives and/or outcomes for the course have been set, it is important to determine if there is an acceptable COTS (Commercial Off The Shelf) solution available. If there is, the solution should be purchased and tested, in that pre-built software is usually much less expensive than software that is custom created. If a COTS solution is found and purchased, it needs to be implemented, as described in the last phase of the process, below.

However, there is no COTS solution, and the project has passed all criteria in the evaluation phase, it should be added to the queue of pending projects in order of priority. If and when this project has the greatest priority, it is time to pass it to the Instructional Design phase.

3. Instructional Design

For the Instructional Design phase, an instructional designer must be assigned to the project. This individual will be responsible for the elaboration of a project management plan including requirements gathering meeting with the client to obtain detailed specifications. Also, the instructional designer must consult with a subject matter expert and obtain additional legacy content or material if available.

Teaching online is not just a matter of presenting relevant pieces of content in the correct order. Learning in a structured course is a process that has multiple stages. The instructional designer of online courses needs to be aware of the needs of users at each stage. If the course is moderated, then the online moderator also needs to be aware of the stages in the online learning experience. Gilly Salmon (2003) suggests the following five stages as learners work through an online course:

- Access and motivation – how do you help people to get online, and once there, how do you make them feel welcome and comfortable with the medium?
- Online socialization – if group interaction is important to teaching an online course, how do you get people to meet and get to know each other?
- Information exchange – how do participants in a course get access to information that they need to learn?
- Knowledge construction – how do you help learners to consolidate the information that is available and turn it into useful knowledge?
- Development – how do you move the learner to continuation of learning beyond the course, and how do you get them to apply what they have learned in settings beyond the course?

With this information in hand, the instructional designer can create a storyboard with modules, text, graphics, activities and assessments. The storyboard is sent to the client for revisions and eventual approval and signoff. Once the all of the signatures have been received for approval, it is time to pass to the Graphic Design phase.

4. Graphic Design

If there already is an existing appropriate design template for the content project, the project can pass directly to the Development phase. If not, a graphic designer is needed to create a design template for the project. User acceptance testing needs to be done on this template and it is revised accordingly. Once completed, the template is added to the existing bank of design templates and is also used for the project.

The qualities of the Graphical User Interface (GUI) used for navigation and interactivity can enhance or detract from the educational impact of a course. Here are some general principles for graphic designers to think about when developing the “look and feel”, navigation standards and layout of an online course:

- a. always try to have a combination of graphics and text on screens, rather than text only;
- b. if you want to “engage” the learner, either use movement on the screen or have the learner carry out an activity. Static text and graphics are often not enough to maintain interest;
- c. movement on a screen should be used to draw attention to an specific point, or for emphasis. Extraneous or competitive animation can distract the learner from what is being taught;
- d. course content is the most important aspect of any online learning program. Make the content the focus in the design. Don’t make the navigation so flashy or busy that it distracts from the courses; and,
- e. before designing instructional activities, analyze the learning task and the characteristics of the learner(s). An instructional activity needs to be appropriate for both, and not just presented for “fun” or for something to do.

Once the graphics are ready the project is now ready to move to the Development Phase.

5. Development

Once a web developer is available to work on the project, development can begin with the creation of the content modules from the storyboard and design templates by using a variety of authoring tools. A rich media approach can involve tools for the creation of text, graphics, animations, video, audio, and interactive learning activities.

User acceptance testing needs to be done for each module with the necessary revisions done as needed. When all modules have been created, focus group testing is done for the entire project including final revisions. Once all of the modules have been completed, accepted and tested, the final stage of the Development phase involves writing the user guides and/or technical manuals where applicable.

Here are some things that a project manager supervising the development of online courses needs to take into consideration:

- Document Naming Conventions - The choice of a universal naming convention is key to the organization of the large number of files created in the development of online courses.

- Version Control – as an online course development project progresses, different versions of planning documents, storyboards, and prototypes will emerge. A version control system is highly recommended in order to avoid confusion in project documentation
- Backup Procedures – while both hardware and software has become more reliable over the years, accidents can and do happen. Backup media should be stored in a different physical location than the originals, or should be placed in a fireproof, waterproof safe.
- Consistency in Design – one of the dangers of developing Web materials in general is that a lot of people have opportunities to change elements of how things will look and work. Strict control of the “look and feel” is needed, supervised by a properly trained designer. In order to create a sense of continuity within a set of courses, a common look and feel design should be employed, through the use of Cascading Style Sheet (CSS) and templates. Templates and cascading style sheets allow for the quick editing of common characteristics and regions of any number of web pages that share the same design files, while maintaining consistency in design.
- Use of Templates - When designing a web course, it is important to maintain a sense of congruency between pages. Rather than starting each page from scratch and rebuilding the common elements for each, a template can be built once, containing all the elements that are to be shared among pages (e.g. background graphics, layout regions, title area, page numbering area, etc). Once the template has been developed (and approved!), developers can start page creation using the template as a source, saving valuable time by only being concerned with the individual content to be displayed.
- Use of Cascading Style Sheets - Cascading Style Sheets (CSS) allow for the setting of various style variables (text font, weight, size, colour, etc.) across a set of pages by storing this data in one location. Not only does using CSSs allow for a font style to be quickly applied to a region on a page in one action, but they also allow for the changing of every instance of the particular style from its centrally stored location. The use of CSSs improves workflow, and also ensures that if the style is properly applied, all content will share common characteristics.
- Use of an Asset Library - In order to maintain a productive workflow, the assets and files used in the development of a course must be properly catalogued, and be easily available for reuse.
- Assembly of a Prototype - Once all the pieces have been assembled (storyboard, design metrics, graphics, templates, style sheets, media assets, etc.), a Web page creation program is utilized to combine all these elements into a “prototype”, a working approximation of what appears on the storyboard. The prototype can then

be shown to the client who ordered the online course in order to elicit feedback and/or approvals.

- **Change Management Procedures** – the development of online courses should have a number of feedback loops whereby both clients (those who have commissioned the course) and a representative group of end-users (those who will take the course) will see the results of the project at various stages. Both the feedback and any changes agreed to with the client should be documented and signed. This protects both parties in any future disputes.
- **Quality Assurance Procedures** – quality assurance procedures need to be instituted from the beginning of an online course development project. Before a version of the online courses is presented to a client, all the online materials need to be thoroughly and systematically checked by someone who is independent of the development team. All “bugs” should be corrected, and then the materials retested, as new errors can be introduced when corrections are being made.
- **Ongoing Monitoring** - Once courses have been installed and released to users, it is important to continue to monitor them in terms of functionality. Sometimes bugs in programming are subtle and hidden and only show themselves after a period of time. Such errors should also be documented and reported to technical staff. As well, a period of time for using the courses that have been developed is needed, in order to assess their effectiveness, and to report any usability problems. Finally, because the technology for online learning is continually changing, there will come a time when an upgraded version of the course will be needed.
- **Documentation and Training** – the final stage of delivering online courses is the provision of documentation and training. A user’s manual, a technical manual and online help files are usually the minimum requirements. Training may not be required if the design of the courses follows familiar design principles, so that learners will not encounter procedures or demands for which they are not prepared.

When the web development phase is completed, the project is now ready to move to the final phase, Implementation.

6. Implementation

The content project is installed in the final IT environment and tested. Learner profiles are set up in the Learning Management System and modules are associated with the profiles. The stakeholders are notified according to the communications plan. Training is provided where needed and ongoing help and is provided when necessary. The feedback is documented for future reference.

Conclusions:

The major benefit of the online content development processes is to guide organizations in the analysis of their current content and deciding on whether it is suitable to be converted to online content and how to effectively present it, from the preparation phase right through the final implementation. During the workflow, all aspects of testing and revising are considered and detailed as to not leave out any important information that could impact the final product. It also details the workforce needed to create online content throughout the process. By following the online content development processes, project managers can be assured that all of the crucial steps needed to deliver a successful online content project are covered.

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