RELAD: A Rapid eLearning Authoring and Development Model

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Abstract

In this paper, a new eLearning model, the Rapid eLearning Authoring and Development (RELAD) model is proposed. This model combines the analysis, design and development steps using new generation of authoring tools. A costing model is also described and it is used to show that the RELAD model can significantly reduce the cost of eLearning development compared to the traditional ADDIE model.

1. Introduction

The current eLearning development model based on the ADDIE: *Analysis, Design, Development, Implementation, Evaluation* [1,2] has many problems in managing the development process. The inherent weakness of this model is basically similar to the deficiency of the Water Fall Model for software development. First of all, after the *Analysis* and *Design* steps, a storyboard must be produced as the requirement document. The *Development* step will then construct all the digital assets and compose them into sharable content objects (SCOs) and lessons as specified in the storyboard. After which, it will be followed by the *Implementation* and *Evaluation* steps. By that time, it is too late to discover that, the final eLearning has not really met the user expectations due to incomplete in the specification of digital assets, SCOs, or lessons. Then, a lot of rework is necessary to realize the final product. In the rework, the user must spend time in evaluating the lessons and providing feedback for correcting the content. Otherwise, it would be impossible to deliver the lessons as demanded by the users. Consequently, most of the eLearning projects would result in project cost overrun and delay.

To remedy this situation, a new eLearning development life cycle paradigm is proposed. This eLearning development life cycle is called RELAD, which stands for *Rapid eLearning Authoring and Development*. In this paper, it will be shown by a simple realistic cost model that RELAD is far superior to ADDIE. In Section 2, the RELAD model will be presented. Then the cost model for both ADDIE and RELAD will be described in Section 3. A 200-frame eLearning content will be used to illustrate the cost differential of both models.

2. The eLearning Development Life Cycle

The ADDIE model shown in Figure 1 is similar to the Water Fall Model in traditional software development. The basic steps of ADDIE consist of Analysis, Design, Development, Implementation, and Evaluation. This model is hinged on the production of the storyboard in the design

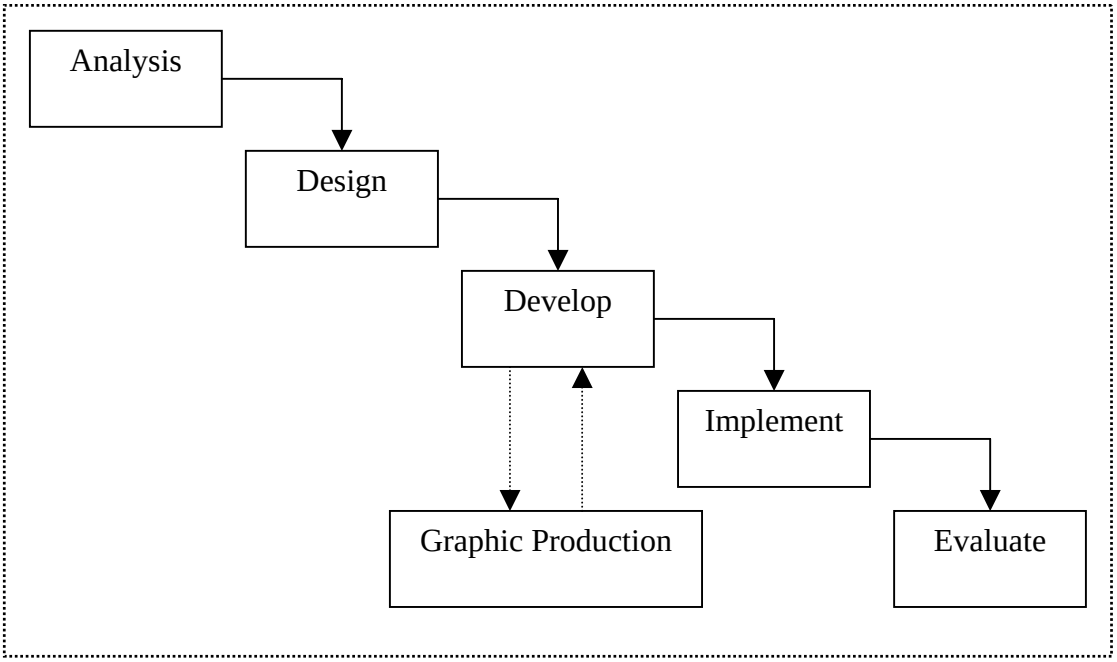

Figure 1 The ADDIE Model

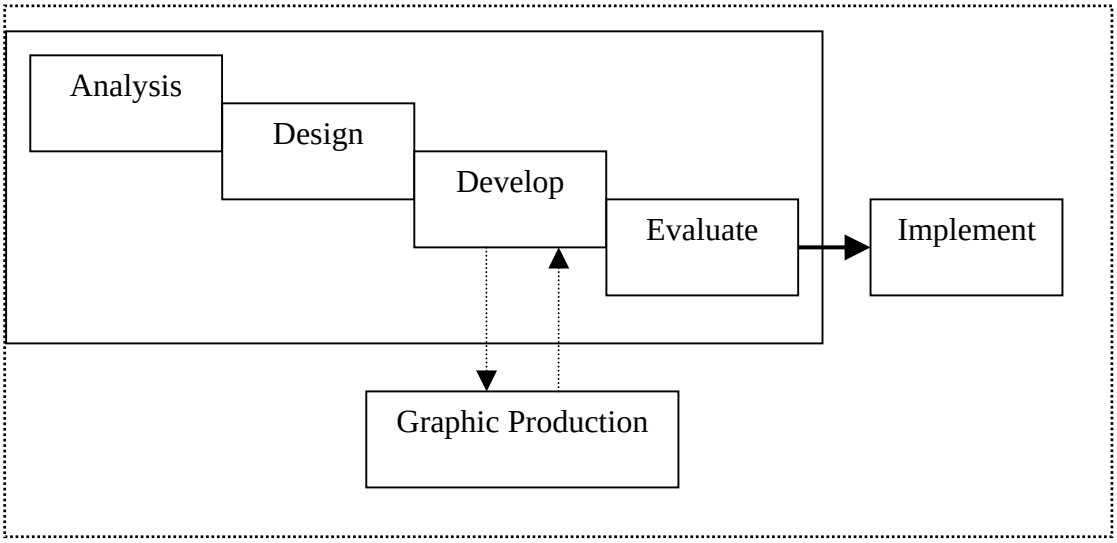

Figure 2 The RELAD Model

step so as the development step can be carried out. In the development step, the typical tool employed is the Macromedia Flash, and Action-script is used for any interactive object implementation. In constructing interactive objects, a flash object must be created and then programmers have to write action-script code to implement the desired effects. This process is the most costly component in eLearning development.

The RELAD model proposed in this paper is illustrated in Figure 2. In RELAD, no storyboard is needed to be produced. The

process would entails joint-user development by which content is segmented and feed into eLearning authoring tool as segmented text frames. Then the instructional designer will work with user to specify the engaging elements, the creative presentation, the composition of objectives, the authoring of assessments. All these are done online using the eLearning authoring tools. Hence, each day of work, a number of actual eLearning frames will be produced albeit that the multimedia asset will be sent for production and assembling the next day. The authoring and development process are well integrated, and the eLearning frames will be used as the storyboard with live presentation (production model). RELAD will significantly improve the production time since the time to produce storyboard is eliminated and the ambiguity of the specification in the storyboard is replaced by the production model with live-interactivity and real/mockup digital assets. Moreover, the production will meet the user expectation since it is joint-user development since the beginning of the project.

3. Cost Modeling

In this section, a simple cost model for both ADDIE and RELAD will be described. Then typical time required for each task in the model will be used to represent the development cost.

Assume that a lesson is composed into m SCOs, each with n_i frames, $i=1..m$. Each SCO consists of *1* objective frame and t assessment frames. Let us define the following variables:

a_n be the cost of producing n frames of eLearning

k be the average number of interactive objects in a frame

g be the average number of flash objects in a frame

p be the number of frames segmented from the base content

$n = p + m + mt$

a_n = cost of segmenting content into p frames + cost of instructional design for p frames + cost of producing nk interactive objects + cost of producing (ng + nk) flash objects + cost of composing m SCO + cost of composing lesson from m SCO + cost of producing mt assessment frames + cost of transforming content complied to SCORM 2004.

Please be noted that in creating nk interactive objects, nk flash objects must be created as the user interface.

For the RELAD model, let r_n be the cost of producing n frames of eLearning content.

r_n = cost of segmenting content into p frames + cost of instructional design for p frames + cost of producing nk interactive objects + cost of producing ng flash object + cost of producing mt assessment frames +cost of publishing content in SCORM format.

Let us examine the time needed to perform each task (hence the cost associated with that task) assuming that Flash is used as the tool for the ADDIE Model.

Segmenting 1 frame	3 mins
Instructional design 1 frame	2 mins
Storyboard 1 frame	5 mins
Producing 1 flash object	60 mins
Producing 1 interactive object (writing program)	300 mins
Composing 1 frame	5 mins
Producing 1 assessment frame	30 mins
SCORM production 1 SCO	30 mins

For the RELAD model in which advanced eLearning tool is used. In this case, the interactive object will be created using pre-built interactive frame. No programming task is needed. For the content publishing conforming to SCORM standard [3,4,5,6,7], it is done automatically. No manual

procedure is needed. Then the time needed to perform such task is as follows:

Segmenting 1 frame	3 mins
Instructional design 1 frame	2 mins
Producing 1 flash object	60 mins
Producing 1 interactive object	3 mins
Composing 1 frame	5 mins
Producing 1 assessment frame	2 mins

Now let us examine the cost of a typical eLearning project with 200 frames of base content structured into 10 SCOs and with 20 frames of contents and 2 assessment frames per SCO. We further assume that 60% of the content frames can be structured using interactive elements and 50% of the frames need flash illustration.

- Cost for the ADDIE Model

Time needed to compose 200 content frames 10 objective frames and 20 assessment frames.

Segmenting 200x3	600 mins
Instructional design 200x2	400 mins
Storyboard 230x5	1150 mins
Interactive objects 120x300	36,000 mins
Flash object 100x60	6,000 mins
Flash object for interactive elements 120x60	7,200 mins
Composing Time (200+10+20)x5	1,150 mins
SCORM 2004 production 30+10x30	330 mins
Assessment frames 20x30	600 mins

Hence, total time needed is 52,500 minutes which is approximately 875 hours or 146 working days.

- Cost of the RELAD Model

Segmenting 200x3	600 mins
Instructional design 200x2	400 mins
Interactive objects 120x3	360 mins
Flash object 100x60	6,000 mins
SCORM publishing	2 mins

The total time needed is 7,362 minutes or approximately 21 working days.

It is obvious from our analysis that the creation of interactive objects using traditional programming via action-script would consume the largest portion of time, hence the cost associated with it. In reality, the actual cost would be much higher since programming errors and changes in requirements would result in additional costs. In our simple cost model, we have not considered the rework of content frames, and the compression and expansion of frames. In the actual design, it might be necessary to add review frames and additional assessment frames inserted inside SCO. It is also possible to compress a group of related frames into a frame tied to an interactive engaging object. This would be for future research.

4. Conclusion

We have proposed a new eLearning content development model called RELAD. In RELAD, the analysis, design and development steps will be combined. The iterative content design and authoring process with user involvement will be used to ensure that the final product meets user expectation. After finishing the design/authoring process, the graphic and flash objects will be produced and inserted to realize the final eLearning lessons. After which, the content will be published in the SCORM format using automatic tool. This model is deployable using current advanced authoring tool [8]. The RELAD model will significantly reduce the cost of eLearning authoring and development. The future research would be in the direction of incorporating other concepts such as review and verification in the life cycle model. Additional possibility is to explore the aspects of dual-content authoring and

development. Also, a more advanced cost model with rework can be worked out to reflect more accurate real-life content authoring process.

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6. References

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