Using a Web-based System to Estimate the Cost of Online Course Production

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Abstract

The increasing demand for online courses requires efficient and low cost production. Since the decision to develop online courses is often affected by financial factors, it is becoming increasingly important to determine, upfront, the cost of online course production. Many of the programs and educators interested in developing online courses underestimate the costs involved in developing and producing an online course. Efficient and reasonable cost estimates can assist institutions and educators to realize the costs of putting a course online and thus can improve strategic planning and budgeting processes. In an effort to facilitate, streamline, and improve the cost estimation process for online course development, the Center for Learning Technologies at Old Dominion University (ODU) has designed a web-based cost estimate system. This online tool enables our institution to determine the estimated costs involved in online course development.

Introduction

According to a recent SLOAN-C annual report (Allen & Seaman, 2006), more than 96 percent of large institutions offer some online courses. As of Fall 2007, nearly 3.9 million students had participated in online courses at U.S. universities (Allen & Seaman, 2008). With more and more faculty members developing and teaching online courses, online course delivery has become a key alternative to face-to-face delivery. Since students now expect and even demand anytime/anywhere access to courses, higher education institutions are increasing their online course offerings to attract non-residents and adult learners. In order to be responsive to students and to market needs while remaining competitive and forward-focused, universities are investing heavily in the design and production of online courses (Bartolic & Bates, 1999). As a result, determining the cost of online courses has become critically important for a university's strategic planning and budgeting processes. Efficient and reasonable cost estimation can assist both institutions and educators to realize the actual cost of offering a course online and can thus improve the strategic planning and budgeting processes.

Researchers (Rumble, 1998 & 2001; Bates, 2000; Hulsmann, 2000) point out that the costs of developing online courses are driven by a combination of factors such as the media and technologies chosen, the materials and equipments, and the staffing costs. In practice, quality online course design and production require a streamlined workflow and the collaboration of several specialists (subject-matter, instructional, and technical) working together in a team environment (Phillips, 2005; Abdous & He, 2009). Among the many requirements and concerns related to the design and production of online courses are time management, resource assignment, formative evaluation, quality control and revision of courses (Chao, Saj, & Tessier, 2006). Considering all of these factors, the efficient and effective estimation of the costs of the design and production of online courses can be a challenging task.

Insufficient cost estimation of the design and production process of online courses can lead to issues such as poor quality course design, unavailable resources, budget shortfall, and course delivery delay. Hence, for a university to be successful in covering the costs associated with offering online courses, the development (and the consequent implementation) of an effective cost estimate model for the design and production process of those online courses is becoming crucial.

To date, many educators interested in developing online courses lack a solid understanding of the costs associated with the development and production of an online course. There are a number of commercial off-the- shelf cost estimation tools available. However, a search did not uncover any publicly available articles about web-based cost estimation tools for online course development. So far, the cost estimate for the design and production process of online courses has received, to our knowledge, little coverage in the literature. In an effort to facilitate, streamline, and improve the cost estimate process of online course development, the Center for Learning Technologies at Old Dominion University (ODU) has designed a web-based cost estimation system based on expert evaluations and on our years of experience in designing and developing hybrid, synchronous, asynchronous, CD-ROM, two-way video, and online courses. This online tool enables our institution to determine the projected costs involved in online course development. The purpose of this paper is to share our experience in designing a web-based cost estimation system for online course development for Old Dominion University. We believe that sharing our experience at ODU's Center for Learning Technologies will prove to be informative and beneficial for those interested in developing online courses.

An Asynchronous Pricing Model for Online Course Development

Many faculty members are interested in developing online courses. However, typically, faculty members interested in developing online courses are experts in their own specific subject matter, rather than experts in online course development. Thus, they often fail to recognize the underling design principles and technology requirements that are necessary to create a quality online course. Many of them also are not aware of the amount of time and expense necessary to develop quality online courses. The question of determining the exact cost of developing an online course has plagued university administrators, faculty, content owners, and content developers for quite a long time.

In response to this issue, we recognized the need to establish an effective cost estimation model, and eventually developed the Asynchronous Cost Model (ACM) for online course development. This ACM is an interactive spreadsheet-based costing model that provides users with a framework to help them estimate the cost of developing their online course. The ACM addresses the categories which most affect the development and production of online courses. The categories include instructional design, interface, text, graphics (clean presentation, graphic

library, and original artwork), photographs, animation (Flash/2-D, 3-D and simulation), audio (background, voiceover, sound effects, and transcription), video (encoding for streaming, studio/post, and location/post), assessment, learning management systems (LMS), and deliverables (VHS tape, CD-ROM and DVD-ROM). Each represents a major section of design or media development within the production process, and each is built using a similar structure. Table 1 describes the items involved in the interface design category and the video (encoding for streaming) category.

Table 1

Items involved in the interface design category and video (encoding for streaming) category.

Interface Design Category	Video (encoding for streaming)
Planning	Planning
Design	Time Dub
Build Interface	Select Content
Build Templates	Digitize
Test	Edit
Modify	Encode
Review	Assembly
QA (quality assurance)	QA (quality assurance)

ODU's Cost Estimate System for Online Course Development

After we established an effective cost estimate model for the design and production process of online courses, we recognized that it is crucial to develop a cost estimate tool based on this model, so that users can apply the model in actual practice. Consequently, we first developed a Microsoft Excel desktop tool in order to facilitate the cost estimation for online course development (phase 1). Subsequently, we developed a web-based tool to conduct the cost estimation for online course development anytime, anywhere (phase 2). The main goals of the tool are (1) to improve the overall quality of cost estimation for online course development, (2) to enhance communication with administrators and faculty by helping them better understand the costs involved in the online course development, (3) to improve strategic planning and budgeting processes, and (4) to serve as a proposal generator if users want their proposals to include detailed cost information.

Phase 1: Year 2005

Based on this framework, a desktop tool was first built in Microsoft Excel, an industry standard for creating financial analysis tools. The structure and formulas are completely open and accessible and can be customized to reflect the unique talent and processes within an organization. If users have seasoned veterans working to develop the media, they can reduce the rule-of-thumb ratios. If users have additional steps within a process, they can simply copy the existing formulas and add them to the spreadsheet. If users need to estimate media that are not included in the ACM, they can copy and modify an entire spreadsheet. Users can also customize the built-in report writer to generate only the pages that they need, pages that can include their logo and branding. The ACM tool (See Figure 1) includes the ability to input raw and loaded labor figures, individual spreadsheets for each type of multimedia and major production processes used to create online courses, and summary pages for total cost and total hours. Quality control costs are built into each development section, and a custom-generated report prints only the data that will be needed for that specific proposal. The ACM tool is flexible and completely customizable, so users can modify it to reflect their organization's unique talent and processes.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Old Dominion University**												
2	**Asynchronous Pricing Model: VIDEO**												
3	**August 25, 2005**												
4													
5	**Encode for Streaming**		**Hours:**	150									
6													
7			Producer Labor			Designer Labor			Technologist Labor				
8	**Category**	*R*	Hours	Amount	*R*	Hours	Amount	*R*	Hours	Amount	*R*	Ratio is amount of time per hour of video.	
9													
10	Planning	0.08	12	600.00	0.08	12	420.00	0.08	12	300.00			
11													
12	Time Dub							0.25	37.5	937.50	1	150	1,500.00
13													
14	Select Content				0.25	37.5	1,312.50	0.25	37.5	937.50			
15													
16	Digitize							0.08	12	300.00	1	150	1,500.00
17													
18	Edit				0.08	12	420.00	0.5	75	1,875.00			
19													
20	Encode							0.08	12	300.00	1	150	1,500.00
21													
22	Assembly				0.25	37.5	1,312.50	0.25	37.5	937.50	0.25	37.5	375.00
23													
24	QA	0.25	37.5	1,875.00	0.25	37.5	1,312.50	0.25	37.5	937.50	0.17	25.5	255.00
25													
26			49.5	2,475.00		136.5	4,777.50		261.0	6,525.00		513.0	5,130.00

Figure 1: The ACM tool as originally designed in Excel

Phase 2: Year 2007-2008

Because of the widespread use of the Web in business and at home, we recognized the value of moving the tool to the Web so that users could access the tool and their cost estimation information anytime, anywhere. We therefore developed a Web-based cost estimation system for online course development. It is based on the same ACM model.

We adopted a rapid application development approach (Robinson, 1995) to the design and development of the system. The system in its present form has been through several iterations of "molding" and "tweaking" based on feedback collected from usability tests and from user reviews.

The following is a brief overview of the key features currently available as part of the system. Users can:

1) Estimate costs using a step-by-step approach

Based on the ACM model, the tool provides faculty with an intuitive, step-by-step guide to enable them to quickly build cost estimates for their online courses. Faculty can enter the raw numbers in categories and subcategories, based on their preferences, needs, and requirements. In the first row of each category, users input the quantity of media or the number of hours of finished course material. This quantity is used to calculate the total cost of specific media or design that will be needed.

After they log in to the system, faculty can either proceed in a linear manner or move from one section to the other.

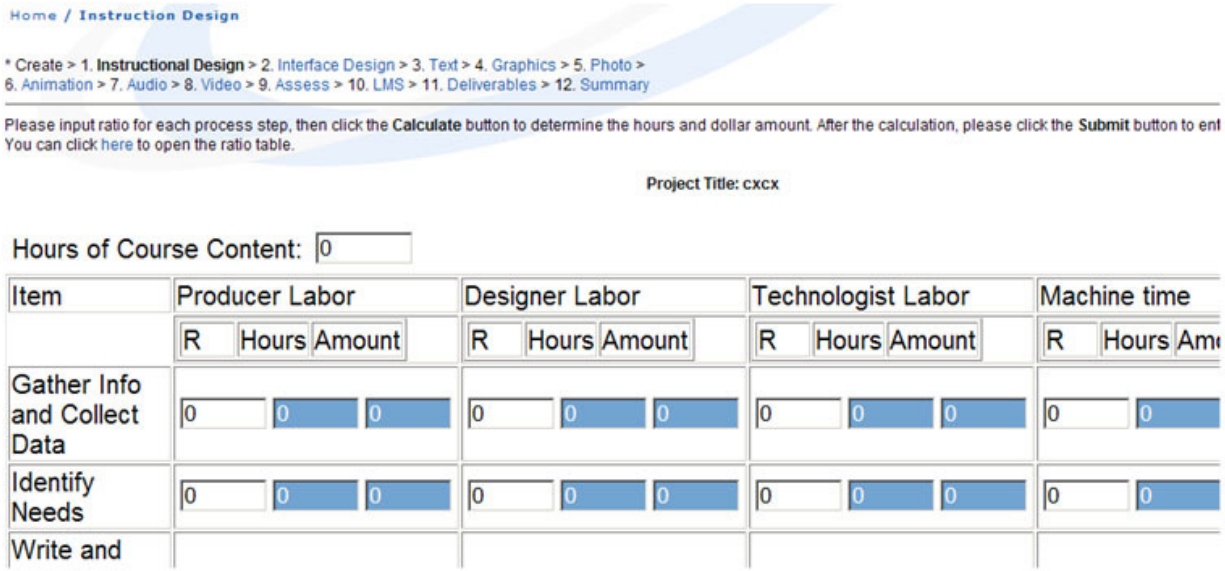

Figure 2: Creating a Web-based cost estimate model

2) View, update, and delete cost estimate models

The system allows faculty members to view, update, and delete their cost estimate models. Users can return to the system and make changes at any time.

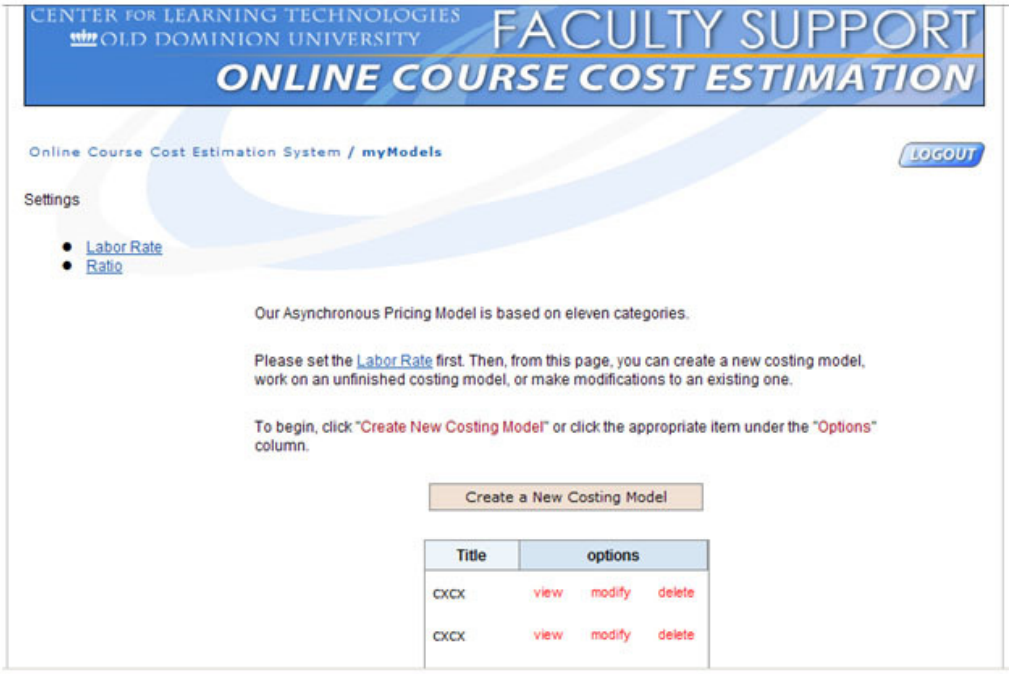

Figure 3: Managing the cost estimate models

3) Generate a Cost Estimate Summary Report in PDF format

Using dynamic data from the database, the system provides faculty a Cost Estimate Summary Report in webpage format. Users can also choose to save it in PDF format.

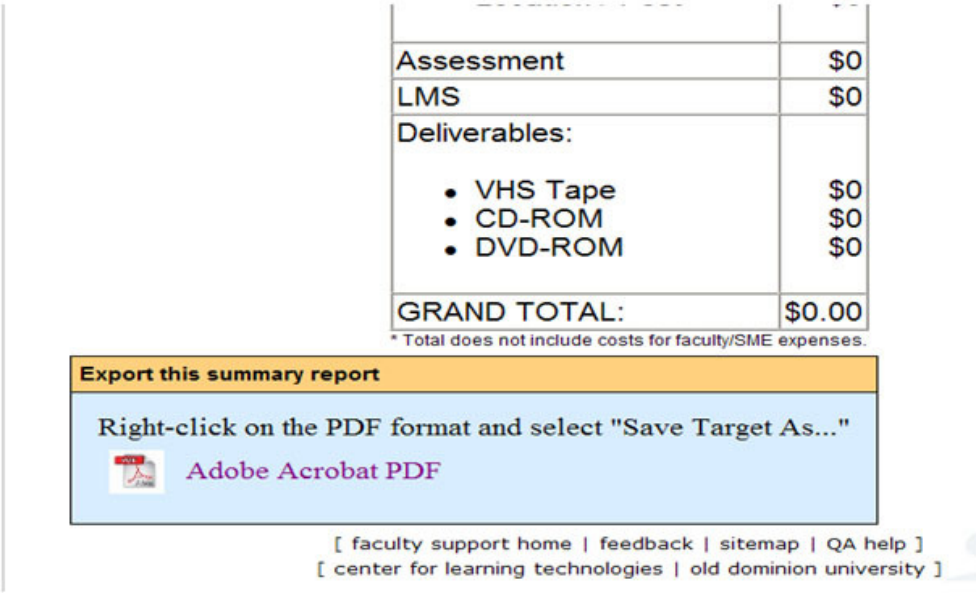

Figure 4: Cost Estimate Summary Report

Technical Architecture

The system is a database-driven tool. To deploy the system on the Web, a Microsoft MSSQL server was used as the backend database environment because of its rich capabilities in supporting the required functionalities. PHP was used as the scripting language in order to create dynamic web content by querying the database. CSS was used to ensure the overall consistency of the system's look and feel.

Conclusion and Future Evaluation

Researchers identified several factors that may affect faculty members' decision to teach online. These include lack of time (Jacobsen, 2000), lack of technological and institutional support (Ansah & Johnson, 2003), and lack of financial support (Jacobsen, 2000). In this paper, we shared the experience of the Center for Learning Technologies at Old Dominion University in designing a cost estimation tool for online course

development. The tool has enabled our institution to provide better technological and decision support to faculty members and to help them, upfront, to determine the estimated costs involved in online course development. We believe that sharing our experience will prove beneficial to those who are interested in developing online courses. It is worth noting that the methodology and ideas we used behind the system are not limited to the cost estimate for online course production. They can be widely applied into any other fields that require cost estimation, such as software development, manufacturing, and construction. A problem encountered in replicating or applying our approach is that the Web-based system doesn't provide the capability to add or reduce items or to change the names of the items. For organizations without staff with programming expertise, we recommend using the interactive spreadsheet-based costing model. Organizations with programming staff can develop and customize the Web-based system to meet their particular needs. Many other possibilities for these cost estimate systems exist and the authors seek future collaboration with any organization that is interested in applying our approach in their work. Interested parties can visit the system's web site (http://preweb.clt.odu.edu/cost) to download the interactive spreadsheet-based costing model or can contact the authors for a demonstration of the web-based system.

Formative evaluation is being conducted to maximize the usability of the tool. Faculty users will be invited to complete a short interface survey to ensure the ease, intuitiveness, and flexibility of the system before we proceed with a more systemic evaluation of the system. We will report the evaluation results as our research progresses.

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