Quality and Growth Implications of Incremental Costing Models for Distance Education Units

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Abstract

The purpose of this article is to explore quality and growth implications emergent from various incremental costing models applied to distance education units. Prior research relative to costing models and three competing costing models useful in the current distance education environment are discussed. Specifically, the simple costing model, unit costing model, and marginal costing model are critically analyzed relative to their quality and growth implications. Finally, the paper will provide rationale suggesting that the marginal costing model represents the most accurate estimation for profitability of distance learning units.

Introduction

A recent nationwide study of distance education (Parsad & Lewis, 2009) found that 66% of 2-year and 4-year institutions now offer online or hybrid courses for their students. One might logically conclude that distance education offerings have certainly hit a "tipping point" and that distance education has a firm foothold in the higher education landscape. This finding is not particularly revealing for members of the higher education community since it would only be a unique traditional institution that would have not at least investigated the feasibility of distance education offerings for their students. While there is a significant range of participation in distance education (limited courses to complete program offerings), many public and private institutions have made forays into this new world of technology application to enhance access to higher education (Annetta, 2004). As more institutions of higher education enter the distance education environment in a significant manner, it is inevitable that costing and profitability estimates become pivotal factors in determining long-term viability (Annetta, 2004; Laaser, 2008).

The process of estimating program costs for traditional on-campus programs has been an important part of the higher education landscape. The inadequacy of these historic models is discussed by the League for Innovation (n.d.), "Many of higher education's costing models were developed in the 1960s and 1970s, when the majority of instruction and curriculum content was written and created by faculty alone for traditional classroom delivery." However, estimates of costs, tuition prices, and program viability for distance education units have not been widely researched (Laaser, 2008). Gordon, He, and Abdous (2009) underscore the importance of costing estimates, "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." Furthermore, as more institutions depend on tuition revenue as the largest source of funding, distance education units are now widely regarded as "profit centers". Traditional campus-based programming

has not attempted to provide estimates of "return on investment" (ROI), but since distance education units are often self-funded operations, a determination of fiscal viability is a necessary evil. Gordon, et al. (2009) articulate the benefits of accurate cost estimation, "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 strategic planning and budgeting processes." Our colleagues in the for-profit higher education sector have long since mastered these estimates, and the public higher education institutions will continue to struggle with costing, profitability, ROI, and viability unless competing fiscal models are thoroughly vetted across the higher education community.

The purpose of this article is to explore the quality and growth implications emergent from various incremental costing models applied by distance education units. This paper discusses prior research relative to costing models, and derives three competing costing models useful in the current distance education environment. Specifically, the simple costing model, unit costing model, and marginal costing model are critically analyzed relative to their quality and growth implications. Finally, the paper will provide rationale suggesting that the marginal costing model represents the most accurate estimation.

Tradition and the Problem

Cost modeling for traditional on-campus programs has been a fixture of higher education systems for many years (League for Innovation, n.d.). Traditional programs have been generally analyzed by looking at the following equation (which we will later name the simple model):

Figure 1. Traditional costing analysis.

$$\frac{\text{Direct instructional costs (faculty salaries and benefits, operating expenses)}}{\text{Student credit hours (SCH) produced}}$$

This simple costing model has generally been effective for campus-based academic programs since the costing model has become widely accepted industry practice by many higher education systems. However, traditional assumptions, like service to mission area and the intrinsic value of general education, have rendered such models largely ineffective for determining long-term program viability. In addition, many important campus elements are not accounted for in the traditional model, and often the model is applied retrospectively rather than as a projection of future program strength and costs (League for Innovation, n.d.). This problem is obviously complicated by the dumping of unique constraints and costs of distance education onto a traditional higher education environment. Many institutions of higher education have struggled with the assumptions that should be made about distance education units. Within institutions, it is imaginable that different stakeholders could envision their distance education unit as serving a variety of operational (and not mutually exclusive) agendas:

- Distance education as traditional academic/public service to a mission defined area,
- Distance education as a consumer product,
- Distance education as a strategic response to address budget constraints.

Several costing models for distance education units have been described in the literature, but most models offer no comparative analysis between traditional analyses of ROI and cost. Table 1 details several of the models, costs included, and costs not included.

Table 1. Distance education costing models comparison.

Model	Costs Included	Potential Costs Not Included
Laaser (2008) Hybrid/cohort instruction costing model *Aligns to the Simple Costing Model*	Facility cost for instruction Instructional costs Average travel costs Learning management software	Academic support Instructional design Administration Library access Academic advising Marketing, recruitment, scholarships
Gordon, He, Abdous (2009) Asynchronous Cost Model (ACM) Online course development model *Aligns to the Simple Costing Model*	Instructional design Interface Text, Graphics, Photos, Animation Audio, Video Assessment Learning management software Media deliverables	Academic support Administration Library access Academic advising Marketing, recruitment, scholarships
Annetta (2004) Asynchronous web-based instruction *Aligns to the Simple Costing Model*	Instructional costs Student costs Hidden costs Recruitment costs	Academic support Administration Library access Academic advising
League for Innovation M3 model Asynchronous web-based instruction *Aligns to the Simple Costing Model*	Development costs Teaching and instructional costs Technology and infrastructure costs	Academic support Administration Academic advising Marketing, recruitment, scholarships
University of Nebraska-Lincoln Synchronous and asynchronous instruction *Aligns to the Simple Costing Model*	Instructional costs Development costs Travel costs	Academic support Administration Library access Academic advising Marketing, recruitment, scholarships

It is because of the ineffective traditional model, and the uniqueness of distance education, that new models of costing and ROI must be reviewed and tested.

Simple Costing Model

The simple costing model for distance education units builds on the assumption that only direct instructional costs are attributable to the program (Figure 1). The obvious benefits to the simple costing model are simplicity and familiar application for determining viability for on-campus programs.

There are significant downsides to the application of the simple costing model for distance education unit costs and return. Application of the simple costing model will result in significant costs, many directly resulting from the increased direct expenses, not appropriately applied to the increase in credit hour productivity. By its very nature, distance education operations require large investments to build the technological infrastructure for course design and delivery. While this technology infrastructure can be utilized for on-campus programming, a substantial portion of the cost should be allocated as cost against revenue generated by expansion of credit hour production. Other fixed costs of the institution are also not allocated to the generation of additional credit hour production: academic support, administration, advising, brick and mortar infrastructure, institutional computing, instructional design, library access, marketing, and scholarships are not appropriately charged against revenue in

the simple costing model. Application of the simple costing model will likely result in liberal costing estimates, thus making distance education credits appear less expensive than traditional on-campus credits.

Unit Costing Model

The unit costing model is an outcome of the assumption that all credit producing units must share in the fixed and variable expenses related to the enterprise as well as the unit. In this model, a percentage of all costs are allocated to the distance education unit, in addition to any direct instructional or indirect costs involved with the unit. Under the unit costing model, sunken overhead costs of office space, administrative personnel, campus infrastructure, and institutional computing resources are charged off against every credit hour produced. Overhead costs that are unique only to the on-campus environment (i.e. repair of a classroom building, grounds crew, museum operations) would not be appropriate to allocate against a distance education offering. Some institutions may find it beneficial to incorporate another classification of costs under the unit costing model – opportunity costs. The unit costing model would be expressed as:

Figure 2. Unit costing model.

$$\frac{\text{Percentage of institutional fixed costs (academic support, administration, campus infrastructure, institutional computing, library access) + Indirect costs (advising, instructional design, marketing, scholarships) + Direct instructional costs (faculty salaries and benefits, operating expenses)}}{\text{Student credit hours (SCH) produced}}$$

The unit costing model clearly allocates resources that are left out of the simple costing model equation, perhaps to an excess. Under the unit costing model, the discussion really focuses on those existing campus resources that are utilized by the distance education unit (students or faculty) as those expenses are likely much larger than the direct instructional costs and the indirect costs. The beneficial aspect of this model is that any existing resources and direct and indirect costs utilized by the distance education unit are considered as costs. Application of the unit costing model will result in a conservative costing estimate, perhaps making distance education credits look more expensive than production of traditional on-campus credit

Marginal Costing Model

The colloquial expression that "the truth lies somewhere in between" may best summarize this approach. The marginal costing model grows out of the assumption that the traditional brick and mortar operations of the enterprise are sunken costs and necessary whether the distance education unit operates or not. Attributable costs under this model count only those additional expenses added as a result of the additional credit hours produced by the distance education unit. Under the marginal costing model the direct instructional costs, indirect costs, and any additional fixed costs (i.e. additional support personnel, new advisors, expanded online library resources) are counted as costs against the distance education credits produced. The marginal costing model has a strong basis in the accounting and economic literature, named incremental cost analysis in those disciplines (Douglas, 1992; Horngren, Datar, & Foster, 2002). The model is expressed as:

Figure 3. Marginal costing model.

$$\frac{\text{Added institutional fixed costs (academic support, administration, campus infrastructure, institutional computing, library access) + Added indirect costs (advising, instructional design, marketing, scholarships) + Direct instructional costs (faculty salaries and benefits, operating expenses)}}{\text{Student credit hours (SCH) produced}}$$

The marginal costing model allocates only those additional resources needed, going beyond the simple costing model. Since only added costs appropriate to the distance education unit are attributable, costing discussions are constrained to actual costs incurred relative to the additional credit hours generated. Application of this costing model in determining return on investment of the distance education unit will result in a moderated incremental estimate, falling between the liberal (simple costing model) and the conservative (unit costing model).

Estimating Profitability

When a determination of the appropriate model(s) is made, estimating profitability is a reasonably simple endeavor. Simply put, profitability of distance learning units occurs when tuition generated from credit hours produced exceeds the cost of producing those credit hours. The expression is simply:

Figure 4. Profitability/ROI equations.

Tuition and Fee Revenue (from distance education credit hours) – Allocated Costs (from distance education credit hour production) = PROFIT
----------OR----------
Tuition and Fee Revenue per Credit Hour - Allocated Cost per Credit Hour = PROFIT per Credit Hour

One obvious caveat bears mention in estimating profitability. Finding a suitable costing model (or models) that will support future planning is critically important. Estimates of profitability will change dramatically depending much more on the costs applied to the distance education unit (since tuition and fees generally increase at a more modest linear pace).

Quality and Growth Implications

The complex balance between growth and quality of distance education units has been well documented in the literature. Increasing the quality of instructional programs will likely impact the market demand for the distance education product, but the relationship is not linear and many other systemic factors must be considered. Many books have thoroughly articulated this relationship, thus this discussion will focus on those features which emerge relative to a comparison of the costing models.

Since the simple costing model carries few expenses, other than direct instructional costs and indirect costs, the implications on quality are potentially significant. Since few expenses are attributable, making the case for adding support resources may be much more difficult. Building additional quality is limited to adding additional instructional costs or improving instructional technology. In the instance of additional instructional resources, an institution may consider simply adding faculty, adding resources for training faculty, or spending more to acquire better faculty. Relative to instructional technology resources, certainly better content management systems would be a justifiable expenditure as would allocating resources to improve instructional design. However, there are expenses not directly attributable under this model, like campus support, academic advising, administrative personnel, and other non-instructional, but critically important, costs. In sum, it would be very important to know whether additional expenses relative to quality improvement will be allowed given the chargeable costs associated with the model.

The growth implications of the simple costing model are the most notable. Justifying additional resources under the simple costing model would be quite easy given the relative small costs compared to the two more comprehensive costing models. Program growth and continuance is nearly assumed as long as tuition revenue exceeds the relatively small direct instructional and indirect costs. Naturally, it must be acknowledged that additional unattributed institutional resources will be required to grow a distance education operation. The long-term risk associated with this sole implication should be weighed judiciously in relation to the short-term benefit of additional tuition and fee revenue. Under the simple costing model, the number of “false starts” will be larger relative to those institutions that apply a more conservative costing model.

The unit costing model has some important quality implications. Namely, since so many institutional costs are already assumed under this approach, the addition of more expenses for the purpose of quality improvement are not as likely to significantly impact the bottom-line profitability of the distance education operation. The addition of support personnel, advising, instructional costs, and other quality enhancement expenses will have less impact on the ROI of the operation given the comprehensive costing nature of the model. There is also an argument to be made since quality of educational offerings is largely a systemic construct not related to just instruction or infrastructure or academic support, but to all parts of the system to varying degrees.

The growth implications that emerge from the application of the unit costing model stem from the conservative standard applied. If a distance education unit has offerings that meet this stringent costing standard, then additional growth can be assumed to be profitable. Since so many of the sunken costs are programmed in, the relatively smaller direct instructional and indirect cost increases from offering additional credits are likely to

have little impact on the long-term profitability. In short, the addition of a faculty resource will not have the same effect under this model as it would under the simple or marginal costing model, which are, by definition, less conservative. "False starts" are not likely under this model, but missed opportunities given this conservative costing equation are a much larger risk.

The quality implications of the marginal costing model are easier to gauge since only those additional quality-related expenses are changed against the additional tuition and fees generated. If an institution can easily estimate the necessary expenses relative to quality improvement, then marginal costs can be adjusted to determine the subsequent enrollment growth needed to achieve profitability. Quality related expenses might include: additional faculty to decrease class size, enhancing an advising center, or new course management technology. If an institution seeks only to maintain a modest profit from distance education operations, then one might say that quality can be improved up to the point that the unit falls into unprofitability.

Justification for growth under the marginal costing model is limited only by the accuracy of the cost estimates of adding the additional credit hours. This model also minimizes the budgetary risk to the institution, since only those additional expenses necessary for program expansion need to be estimated. "False starts" are fewer relative to the simple costing model, and not significantly greater than if the unit costing model is applied. The profitability of growth under the marginal costing model should be studied more closely in situations where an institution has seen substantial fluctuation in tuition and fee revenues, but generally this model offers the most risk management while allowing a distance education unit flexibility to build innovative offerings to meet quickly emerging needs.

Conclusion

With distance learning reaching a critical mass in higher education, the need for more robust models of costing and return on investment has never been greater. Historic models of cost estimating have proven successful for traditional programs, but these models often miss the unique expenses that must be appropriately allocated for successful profitability projections of distance education programs.

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