Cost–Effectiveness

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INTRODUCTION

Online education offers strong intrinsic potential for advancing and augmenting teaching and learning through broadening and deepening access. Proponents of online education further claim extrinsic potential – that it should be less costly and just as effective as traditional education, if not more so. They consider the instruction equally or more effective relative to such factors as the depth of course content presented, student outcomes and breadth of access (Duderstadt, 2000; Allen & Seaman, 2003; Gomory, 2001).[1] Are these claims accurate? How would we gauge their accuracy? What data would we collect? How would we make sense of that data?

As in medicine and other social domains, there is a long-standing tradition in research on education of measuring the comparative costs and benefits of different interventions or modes of operation. Prominent examples of such interventions as assessed in this manner have included curricular reform, personnel restructuring, special programs, infrastructure improvements and class size innovations. The goal of these measurements is to identify the best course of action by gauging the relative ratio of cost to benefit. Policy may then be informed by the results of those measurements. Cost-benefit (C/B) studies include a range of research that may focus on effectiveness, efficiency, utility or simply overall benefits. Policy concerns and other constraints on (or drivers of) research may favor one sort of C/B study over another. Nowhere is this clearer than in the case of online learning and technology, which by its nature is an excellent candidate for cost-effectiveness (C/E) research.

BACKGROUND

Why C/E Research on Online Learning and Technology?

From a policy perspective, the main question concerning the creation or deployment of any new technology is whether in the balance it advances our abilities and outcomes in the instances in which it is deployed. In the broad domain of instructional technology, the answer to this question depends on whether teaching and learning are better in the new technologically mediated instructional context than in other comparable contexts, notably including traditional, face-to-face instruction (Finkelstein & Scholz, 2000). In the particular case of online education, such comparisons may be appropriately drawn with other forms of technologically enhanced instruction, including teaching via other media that help bridge distances and broaden access, such as radio or television. For comparisons of this sort, the goal is to tease out different ways in which traditional or new means of teaching and learning are more successful than the going alternative (Bates, 1995). In this regard, the two leading indicators are cost and effectiveness. Looking at costs tells us how affordable the alternatives are and whether savings or reductions in cost growth are possible. This in turn can tell us whether the institution can be fiscally responsible in pursuing the innovation (Rumble, 1997). Looking at effectiveness tells us whether and to what degree the technology is an enabling one. A technology may be considered enabling in the instructional context if it facilitates teaching and learning at levels of performance and quality consonant with or exceeding past practice. This in turn can tell us whether the institution

can be educationally responsible in pursuing the innovation. From these two facets of cost and effectiveness, the pertinent C/E question emerges: Can online technologies be used to deliver instruction in ways that reduce or control costs and sustain or augment educational outcomes? If so, how? Beyond pure research aims, such studies thereby address two paramount policy concerns.

COST-EFFECTIVENESS: METHODS, ISSUES AND PROBLEMS

To compare C/E of online and traditional education, researchers conduct experiments following standard models of social science investigation by creating control groups, taking randomized samples and correlating data. The goal is to identify the circumstances under which teaching online may attain either equivalent or improved cost savings or reductions in cost growth in pedagogic outcomes. Other measures of an innovation's benefits may only require looking at its consequences in absolute terms. Measures of effectiveness, by contrast, are inherently relative. So, too, are C/E measures, as they depend on the relative effectiveness figures. To find out whether teaching online affects outcomes or influences the ratio of outcomes to costs, C/E measures must be taken for a variety of circumstances, differing precisely as regards the nature of the instructional medium (Levin & McEwan, 2000).

At a general level, the focus of C/E studies is to establish the effectiveness of a given intervention against the background of the associated costs. In this context, a number of more narrowly focused questions arise. For one, can instructional technologies be deployed without incurring greater costs than may be recouped by later savings? Until recent times, American universities and colleges made relatively few efforts to promote efficiencies through the use of instructional technologies such as radio, television, film or mainframe computing. One obstacle to further investment was the tremendous fixed costs of initial creation and deployment of the technology. Over the last couple of decades, though, academic institutions made substantial investments in instructional technology. One motivation for these investments is optimism about the possibility of eventually outpacing such fixed costs with sustainable, low-marginal cost

uses of technology. C/E studies may help gauge the prospects for that possibility.

Another specific question is: When is a greater cost-effective scenario preferable over any lesser cost-effective scenario? For example, it is possible that technologies help cut, or lower the rate of, rising costs – but only at the expense of educational quality. If access to education is broadened or enriched in some other dimension, we may wish to accept the tradeoff. Some instructional qualities may be paramount, even though they may block any appeal to cost savings on the more C/E scenario. Much depends on what we deem essential to education.

One much broader question is what a large enough set of C/E studies might reveal on the whole. By assembling a set of comparable C/E studies, it should be possible to determine phenomena like tradeoffs, equilibria and optimal states. Is it ever reasonable, as a function of costs, to reach larger numbers of students when outcomes are negatively impacted? Are there particular sorts of expenditures that remain stable, no matter the technological resources or student outcomes? Does the ratio of cost to effectiveness level off for any particular series of parameters, such as types of institutions, disciplines taught, or online teaching formats and technologies? Collecting groups of like studies holds the promise of addressing such questions. In this way, we may learn whether online education may be cost-effective across individual cases in a more general sense than typical stand-alone studies suggest.

Defining Ingredients and Getting at the Data

C/E studies of online education require a variety of expertise regarding pedagogic evaluation, costs measurement, education policy and instructional technology. Each of these areas is difficult enough to master, and it is nearly impossible to find individuals with all requisite interests, much less expertise. Teamwork is critical.

A first step in measuring pedagogic outcomes is to decide on accurate measures of student performance in a course. Performance and behavioral outcomes that may be measured include final grades, knowledge retention across semesters, enhanced communication, skills building and time on task. Before all else, there must be a consistent notion as to what consti-

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