Ten Scalability Factors in Distance Education

R. Dwight Laws
Brigham Young University

Scott L. Howell
Brigham Young University, scott.howell@byu.edu

Nathan K. Lindsay
University of Michigan

Follow this and additional works at: https://scholarsarchive.byu.edu/facpub

Part of the Educational Psychology Commons, Educational Technology Commons, and the Higher Education Commons

Original Publication Citation

BYU ScholarsArchive Citation
Laws, R. Dwight; Howell, Scott L.; and Lindsay, Nathan K., "Ten Scalability Factors in Distance Education" (2009). Faculty Publications. 5776. https://scholarsarchive.byu.edu/facpub/5776

This Peer-Reviewed Article is brought to you for free and open access by BYU ScholarsArchive. It has been accepted for inclusion in Faculty Publications by an authorized administrator of BYU ScholarsArchive. For more information, please contact ellen_amatangelo@byu.edu.
Ten Scalability Factors in Distance Education

R. Dwight Laws
Brigham Young University, USA

Scott L. Howell
Brigham Young University, USA

Nathan K. Lindsay
University of Michigan, USA

INTRODUCTION

The institutional decision about how much technology should be used to scale distance education enrollments, reduce costs, maximize profits, and protect course and program quality is both institutional specific and complex. Guri-Rosenblit (1999) noted that “many conventional universities worldwide operate as large-scale universities and are in a continuous search to find the right balance between massification trends, quality education, and the catering to the individual needs of students” (p. 289). This research is an outgrowth of the authors’ own efforts to identify relevant scalability factors and their interrelationship one to another in a traditional university’s distance education program.

This article identifies 10 additional factors beyond information technology (IT) or information communications technology (ICT) that merit careful consideration by decision makers as they define their own institutions’ degrees of scalability. Each institution’s level of scalability is determined or characterized in part by the interrelationship of these 10 factors within their given technological context or infrastructure: interaction, learning levels, student class standing, faculty tenure or continuing status, completion rates, cohort versus noncohort settings, degree- versus non-degree-seeking programs, market type, tuition costs, and profitability. The authors briefly examine their own distance education program and others, including those of mega-universities, across these 10 scalability factors.

BACKGROUND

Scalability at many universities is defined as the ability to increase enrollment while still remaining profitable, or at least financially self-sustaining, without adversely affecting course and program quality. Scalability for many mega-universities is defined as reducing costs to retain eligibility for government subsidies, grants, foundation awards, and other funding sources (This will be discussed in further detail later in the article.). In any case the perpetual challenge for universities is to effectively manage the tensions of the eternal triangle: to widen access, to improve quality, and to lower costs. Achieving success within the constraints of this straitjacket sounds impossible, but is nonetheless deliverable in varying degrees (Daniel & Mackintosh, 2003).

One large distance education program in the United States, Brigham Young University (BYU), with total annual enrollment approaching 100,000—the threshold for being considered a mega-university—has experienced extraordinary growth in the past 7 years in its university enrollment and unprecedented growth in its secondary and noncredit enrollments. In 1996, there were 37,691 total enrollments, and at the end of 2003, there were 96,513 enrollments. The program has managed to multiply three times over this time period and remain very profitable, but like many other institutions, BYU is trying to “manage the tensions of the eternal triangle” as it seeks to determine the acceptable but certainly varying degrees of scalability and success.
(Professor Farhad Saba, Letter, June 11, 2003), international distance education consultant, recently made a site visit to BYU and wrote in his final report, “The outstanding question for [BYU’s] Independent Study, as well as for the university community, in general, therefore, is to what extent courses could be made scalable...”

The large mega- and open universities of the world, such as Anadolu University, China TV University System, Universitas Terbuka, Indira Gandhi National Open University, Sukhothai Thammathirat Open University, Korea National Open University, Payame Noor University, the Open University (United Kingdom), and so forth, are accustomed to an enrollment scale that most distance education programs elsewhere in the world have not even considered. Sir John Daniel, president and chief executive office of the Vancouver-based Commonwealth of Learning, reported on September 7, 2001, that a new course at the Open University (United Kingdom) entitled, An Introduction to the Social Sciences: Understanding Social Change “attracted nearly 13,000 students, an all-time high for a single course” during the previous year (p. B24). Contrast this success scaling a course at a mega-university to the following perspective on scalability by Jeffrey E. Feldberg, chairman of Toronto-based Embanet Corporation, which represents a much smaller North American distance education program:

We have all heard of a college or university that was successful with one or two courses and then had major problems when they scaled to multiple courses...going from 20 to 30 online learners to 2,000 online learners requires a different skill set, IT environment, and resources...If you are unable to scale, you are out of business. (Feldberg, 2001, p. 3)

While the issues, challenges, and questions about scalability differ from one institution to another, these differences vary in degrees across the 10 factors discussed in this article. However, all institutions seek some measure of scalability as they endeavor to maintain or increase enrollment, leverage scarce resources, minimize or contain costs, maximize profits, and establish a sound IT and ICT infrastructure. Sir Daniel, upon receipt of his honorary doctorate degree from the Hong Kong Open University, said that this idea of scaling for open universities is not a theoretical issue because of numbers and associated costs. He said that even trying to experiment with a new method is risky,

\textit{Figure 1. Ten scalability factors}
especially for students, if not done correctly because a “small” experiment is not small when it comes to the large-scale context that open universities must operate within (Daniel, 2002).

**SCALABILITY FACTORS**

Scalability for distance education institutions, including mega-universities, is defined by a complex set of at least 10 interrelated factors. In Figure 1, 10 scalability factors are depicted: interaction, learning levels, student class standing, faculty tenure or continuing status, completion rates, cohort versus noncohort settings, degree- versus non-degree-seeking programs, market type, tuition costs, and profitability. Superimposed over these factors is a rudimentary three-level relationship or categorization loosely illustrated by the solid-line, dotted-line, and no-line rectangles. Generally and roughly speaking, the solid-line rectangle represents the profitable courses, and programs that employ automation and target lower learning levels. The dotted-line or middle rectangle in Figure 1 represents moderately profitable courses and programs, whereas the far-right, no-line rectangle represents the less profitable, more specialized, but higher level learning courses and programs.

The solid rectangle in Figure 1 depicts BYU Independent Study’s level of scalability. BYU’s profitable distance education program focuses on secondary through second-year (sophomore) university students. This program features an automated assessment-feedback system called Speedback™ for many lesson assignments, assesses lower tuition costs for students, and is less able to influence faculty load, rank, and status issues. However, the trade-offs for this kind of scalability yield moderate levels of completion since students enter courses anytime without a cohort and progress at their own pace without the faculty-student or student-student interaction that would be expected for the higher grades and levels of learning.

Many mega-universities operate in the middle or far right of Figure 1, which includes degree programs (undergraduate and graduate), cohort groups, higher levels of learning and completion, and more faculty involvement and consideration for continuing status. However, faculty and tutoring burdens are greater, costs are higher, and subsidy requirements are more significant.

The reader will benefit from referring to Figure 1 occasionally as the 10 factors are briefly introduced. The interplay among the factors is complex and the graphical attempt to represent the complex and institution-specific interactions is an oversimplification. Nonetheless, sliding the imaginary rectangle across the graphical depiction of factors should be illustrative of the relationship among some factors and of the more complex interplay among all factors.

Now a brief introduction—more brief for some factors than others—of the ten factors follows.

**INTERACTION**

Multiple pedagogical models exist for delivering instruction from a distance, but a primary concern of all programs is the degree of “student-instructor interaction... [which] is considered the soul of collegiate learning” (Eaton as cited in Paulson, 2002, p. 132). Many experts have categorized these models as being either high tech or high touch (Patton, 2003). Allen (2001) refers to the high-tech approach as the broadcast model, which is “characterized by a mainly one-way transmission of information, an intensive use of multimedia technology, relatively large class sizes (30+), and an emphasis on independent study by students” (p. 62). While not very student-instructor interactive, such an instructional approach is scalable after initial development costs have been covered. In comparison, Allen describes the high-touch approach as the interactive model, which always involves more human resources, especially faculty, to support the more interactive environments and smaller class sizes while requiring less automation, standardization, and technology.

Models of delivery requiring significant instructor-student interaction and mentoring typically have large labor costs, even though students, surprisingly, do not always use the available instructional support as much as they could. Many educators believe the most prized interaction is between the student and instructor, and as such, this type of interaction bears the most market value (Anderson, 2002). This is true even though learners sometimes
prefer otherwise when considering their overriding need for convenience. As one example, James (as cited in Daniel, 1996, p. 187) says, “In both Thailand and Spain students cite lack of contact between themselves, tutors, and other students as the greatest problem with distance education, yet attendance at study centres is relatively sparse.”

John Sener (personal communication, March 25, 2003) of Sener Learning Services notes that a tension exists in distance education “between learners wanting the perceived benefits of synchronous interaction, and learners having a high need for maximum flexibility and convenience.” Sener explains that this creates two problems: “accommodating both types of learners in the same course, and streamlining course design to minimize wasted time.” He suggests that rather than try to find a happy medium, programs should establish “different course sections clearly identified by delivery mode and have learners self-select based on their preference.” He acknowledges, however, that “this adds yet another layer of complexity to the process and is not practical in many situations.” This solution of self-selection runs counter to an institution’s efforts to streamline costs and ensure optimum scalability.

Faculty-to-student, student-to-student, and student-to-content interaction establish the context of learning for all students. However, it is difficult and costly to do all types of interaction all the time. Distance education researcher Terry Anderson (2002, p. 4) made the following observation:

Sufficient levels of deep and meaningful learning can be developed as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at very high levels. The other two may be offered at minimal levels or even eliminated without degrading the educational experience. High levels of more than one of these three modes will likely deliver a more satisfying educational experience, though these experiences may not be as cost or time effective as less interactive learning sequences.

The interaction factor is arguably the most important factor of enrollment and profitability scalability.

LEVELS OF LEARNING AND CLASS

Critical-thinking skills and lifelong-learning attitudes are the goals of education. Taxonomies of learning, for example, Bloom’s taxonomy represented in Figure 1, depict higher levels of learning, frequently called critical-thinking skills, building upon lower levels of learning. Many first- and second-year university courses will have lower level learning characteristics that lend themselves to more automation and less instructor-student interaction than do the third- and fourth-year and graduate university courses. Obviously, programs that target lower levels of learning will also be more common among kindergarten through the twelfth grade and the freshman and sophomore years in college, whereas programs that target higher levels of learning will be among upper classmen, including junior, senior, and graduate classes. The opportunity for enrollment and profitability scalability are usually easier to realize with courses and programs that are more easily automated for the introductory courses common in high school and the first year or two in college.

MARKET TYPE (OPEN AND RESTRICTED)

Another factor in determining scalability is to determine which markets most fit institutional goals. The most common market categories include degree-completion learners, professional-enhancement learners, corporate learners, college-experience learners, life-fulfillment learners, precollege K-12 learners, and remediation and test-prep learners (Oblinger & Kidwell, 2000). Some of these markets may be wide open and extensive, whereas others may be restricted or specialized. Graduate-level programs will always be more narrow and restricted than introductory general-education and liberal-arts courses and programs will be. Each market type has its own scalability potential. Corporate learners and undergraduate degree-completion learners probably have the highest market potential to scale because of their automation capacity, while remediation and
test-prep learners and graduate-degree learners probably have the lowest market potential to scale because they are limited markets and have more overhead to support.

**FACULTY TENURE**

One of the most common challenges to scalability is continuing to use professorial faculty within the traditional tenure track system rather than introducing more adjunct, part-time, professional, and/or nontenured faculty. Frequently, traditional faculty involvement in distance education does not contribute to their tenured status and in some settings is actually considered detrimental. Thus, to the extent that distance education is a priority for the institution, administrators should align distance education goals with the university’s faculty feedback and reward system whenever they exist. If they do not exist, then both university and faculty alike will be well served to develop progressive policies about faculty involvement in distance education initiatives that balance institutional objectives and scalability goals. Mega-universities recognize this need and have chosen to be more progressive in granting consideration to their traditional faculty for their work in distance education, while at the same time introducing more nontraditional faculty into their programs to better accommodate their scalability requirements.

**COMPLETION RATES**

The distance education literature indicates that the course and program completion rates in distance courses have historically been extremely low: 40% to 50% at best (Moore & Kearsley, 1996). This statistic is not true everywhere, especially since there is no standard for calculating completion rates for both campus and distance education programs. Many distance education programs, including mega-universities, claim a 90% or greater retention rate when they calculate completion rates similar to their classroom counterparts (Howell, Laws, & Lindsay, 2004).

Whatever the case, many experts consider learning motivation to be “more important in distance education courses than in conventional courses, because distance learners with low motivation have more of a tendency to drop out or fail” (Jung, Choi, Lim, & Leem, 2002, p. 160).

**COHORT VERSUS NONCOHORT AND DEGREE SEEKING VERSUS NONDEGREE SEEKING**

Institutions must also decide whether students progress individually in an open enrollment setting or together with their class as a cohort, both at the...
course and program levels. Small classes with higher levels of mentoring and collaboration usually characterize a cohort progressing through a degree program. In contrast, non-degree-seeking students start and stop a course at their own convenience. Self-directed and automated approaches, more common in noncohort and non-degree-seeking programs, are typically more scalable. However, Oblinger and Kidwell (2000, p. 38) assert that “most students are seeking a degree or credential” and most degree programs use a cohort model that supports increased instructor-student and student-student interaction.

**TUITION COSTS**

Tuition costs continue to rise everywhere, especially as institutions pass the burden of rising costs and funding gaps to their students. Those programs that have significant faculty and tutor intervention, little automation, restricted markets, and higher levels of learning would be expected to levy higher tuition costs as they defray additional overhead expenses. In contrast, those programs that are highly automated have open markets, lower levels of learning, less concern about faculty continuing status, lower completion rates, fewer expenses, and higher enrollment.

**PROFITABILITY**

The annual market for distance learning in the United States alone is currently $4.5 billion, and it is “expected to grow to $11 billion by 2005” (Kariya, 2003, p. 49), a growth phenomenon occurring worldwide. Despite the promising potential for scalability, serious financial obstacles exist in administering distance education. Because of small margins and fierce competition, “few if any organizations are currently making real money from commercialized higher education online courses” (Bates, 2000, p. 6). Many distance education programs, including mega-universities, would not survive without subsidy from their government sponsors.

Profitability scalability for BYU’s distance education program and similar programs means that the program becomes self-sustaining or profitable without receiving institutional subsidy. In Figure 2, the sunk, fixed, and variable costs aggregate to become the total-cost line. As enrollment and income increase across the x- and y-axis respectively, the total-income line eventually overtakes the total-cost line at the break-even point. Prior to this break-even point, the program is not self-sustaining and requires subsidy; however, after the break-even point is reached, the program becomes increasingly profitable.

*Figure 3. Cost-reduction for mega-universities*
Profitability scalability for mega-universities means maintaining or reducing costs to ensure continuing subsidy from government or other funding sources. This past year, the Open University UK reduced the cost for its distance education students from £12,000 to £10,000 to qualify for continuing subsidy from its government (D. Newbould, personal communication, January 5, 2004). In Figure 3, the slope of the total-cost line is higher and steeper than represented in Figure 2 due to increased costs associated with more faculty involvement shown in the mentoring and collaboration box of Figure 1. As enrollment increases, the total-income line moves closer to the total-cost line, but since the slopes of the two lines are nearly parallel, it takes extremely large numbers of enrollment before the two lines ever converge so that the university can break even or earn a profit. In Figure 2 the program is most scalable as it is most profitable; in Figure 3 the mega-university is most scalable when it is most cost efficient.

FUTURE TRENDS

Oblinger, Barone, and Hawkins (2001, p. 2) assert that “new technology will transform higher education as we know it today.” In this technological context, competition will increase and funding challenges for many government- and private-sponsored institutions will continue to require institutions to reexamine factors of scalability that will ensure their ultimate survival and success. As consumers, learners will look to education as a commodity and surrender one-institution allegiances to a number of institutions who can scale to meet their needs, interests, and circumstances. Those institutions who have anticipated changes in these educational models and learner markets will enjoy the opportunity of using new technologies to help them scale not only their enrollment and profits, but more importantly, their influence.

CONCLUSION

This article has focused on scalability as defined by the relative presence of 10 factors of scalability: interaction, learning levels, student class standing, faculty tenure, completion rates, cohort versus noncohort settings, degree- versus non-degree-seeking programs, market type, tuition costs, and profitability. It was assumed that technology, the IT infrastructure, was the enabling agent in any institution’s decision to scale either its enrollment, profits, or both, and that quality characterized the learning outcomes for each learner. For some distance education providers, the goal is simply to provide access to educational resources while containing costs; other institutions have as their mission the requirement to be self-sustaining or profitable while serving a narrowly defined learner market. While continuing to recognize the complexities in defining scalability and the relationship among its factors, three very oversimplified categories of relationships or interactions emerged across the 10 factors: low, moderate, and highly scalable distance education programs.

SPECIAL ACKNOWLEDGEMENTS

This publication was made possible with the support of the Brigham Young University Division of Continuing Education. A more lengthy version of this article was published by the Online Journal of Distance Learning Administration (OJDLA, winter 2003, Volume 6, Number 4) and entitled “Scalability in Distance Education: ‘Can We Have Our Cake and Eat it Too?’” All copyrights for this original publication are retained by the authors and full permission for publishing this derived work has been given to Idea Group by the authors.

REFERENCES


Ten Scalability Factors in Distance Education


KEY TERMS

Automated Approaches: The industrialization of the teaching process using technology.

High Tech: A colloquial phrase meaning more use of technology than human resources and people.

High Touch: A colloquial phrase meaning more use of human resources and people than technology.

Massification: Widespread adoption of technology, bringing with it uniformity.

Mega-Universities: Large distance education programs, often known as open universities, with total enrollment exceeding 100,000.

Open University: A university, typically employing distance education technologies, that provides open access and admission to all within the country or region.

Scalability: The ability to increase enrollment while still remaining profitable, or at least financially self-sustaining, without adversely affecting course and program quality.

Self-Directed Approaches: Students have control over their progression, or pacing, in a course or program.