Funding and Cost Containment of Educational Technology: Shifting Policy and Practices

A paper prepared for SREB and WCET through the Technology Costing Methodology Project Initiative funded by the Fund for Improvement of Post Secondary Education (FIPSE)

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September 2002

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Introduction

Education funding comprises the largest single element of any state budget. As a result, the philosophical, political and practical debate over the very nature of the education process engenders great passion among policymakers and citizens alike. The character of this debate does not radically change from year to year, yet the increased use of technology and the funding challenges it presents demonstrates the need for a sharper focus on:

- reliable methods for cost containment and
- realization of the changing nature of the instructional process.

Technology is changing the nature of instruction and the classroom activities in the schools, colleges and universities and states and institutions need to find better ways of matching financial resources with the way education is delivered.

Statistics from the U. S. Department of Education indicates that distance learning enrollments doubled as percent of total student enrollments in higher education from 1994-95 to 1997-98. While no recent national follow-up study has been completed, anecdotal evidence and individual state statistics indicate steady growth over the intervening years. Similarly, student enrollment data for Florida's state universities indicates that courses reporting technology as a secondary form of delivery (6,754 sections) outpaced those where technology was reported as the primary form of instructional delivery (4,790 sections) during the 2000-01 academic year.

Challenges to the Status Quo

Despite technology's growing presence as a central component of instructional delivery, approaches to educational technology funding have not advanced to match the speed of this change overtaking our states and institutions. An examination of traditional funding practice in several areas illustrates the need for new approaches to funding and financial management. Areas such as:

- infrastructure development and maintenance,
- acquisition of instructional content,
- operation of the library and its increased reliance on digital content,
- faculty and staff workload, and
- student support services.

On most campuses today these issues are becoming increasingly difficult to address using existing budgeting and finance strategies.

Infrastructure

The delivery of instruction and services using technology requires a robust highway upon which to travel. This highway or basic technology infrastructure is a complicated network of telecommunications circuits, routers, switches and personal computers linked together and controlled by software systems. As the Internet has grown and the speed of technological change has increased, more institutions and states have wisely moved from trying to build and own infrastructure to leasing or contracting for levels of service. Two primary areas where this has occurred involve hardware (computer workstations and telecommunications circuits) and software systems. In Florida, like many states, contracts exist for the leasing of both telecommunications circuits and computer hardware. The Florida Information Resource Network (FIRN) is the primary state-level education network for schools, colleges and universities. FIRN is a combination of state-owned equipment and leased network access circuits that are secured as a part of an overall state-level procurement process that leverages the buying power of the all of the agency needs for Florida. As a result, all of the state agencies receive the benefit of discount pricing based upon combined purchasing power and the majority of the costs associated with obsolescence are avoided. The purchase of computer hardware and software has been addresses in much the same way. The public community colleges have combined their purchasing needs for computer equipment and the resulting RFP under the name Technology Refresh Program has resulted in a three year agreement that includes equipment, pricing, maintenance, financing, leasing and trade-in, producing a possible long-term relationship. The agreement is open to all education institutions in the state and provides savings and benefits beyond existing state government contracts.

For the most part, technology infrastructure may show up in budget worksheets as computer hardware and payments to telecommunications vendors for network services. The maintenance of this network, which is the basis for every aspect of student instruction, support and service in distance learning as well as administrative data processing, must be provided for on an annual basis. Without recognition that ongoing funding is needed for continued maintenance and operation of newly integrated equipment and services, a stable infrastructure cannot be maintained. As increased use is made of the network for instruction, there is not enough understanding on the part of policymakers about the actual critical nature of the infrastructure itself. The reality simply is that like bills for electricity or salaries for faculty, the costs of telecommunications infrastructure are ongoing and must be a part of the operating costs of education budgets.

With students learning activities becoming more prevalent outside of a traditional classroom environment, increasingly some software systems or tools to provide organization to content and manage faculty-student interaction inside and outside of the classroom have emerged. These content management systems are increasing in their frequency of use throughout education and they are often integrated into management and student information systems at the enterprise level. The Campus Computing Project 2001 survey results indicate that one-fifth (20.6 percent) of all college courses now use course management tools, a 5.9 percent increase from the previous year. These content management systems (examples include Blackboard and WebCT) are licensed for use over a one or multi- year period. The systems have capabilities that increase in integration capabilities or student capacity depending upon the level of the product licensed. While some institutions may have a content management system that they own, the majority licenses such software. Considerable concern has emerged over changes in features and licensing models that have resulted in price increases of as much as 500 percent for some institutions. Although many institutions have serious questions about future licensing of such systems that manage the critical student-faculty learning process, the capital cost and complexity involved in developing an alternative is beyond the capability of most institutions. Master agreements to leverage buying power have been used in Florida to establish access to discounted pricing and a stable relationship with vendors. In both Georgia and Louisiana, single vendor enterprise-level agreements have produced considerable long-term cost savings. Stability in pricing and feature sets may be sometime off as standards and alternatives currently under development in the public and private sector emerge over the next two years.

Instruction

Typically instruction requires at least two types of content.

1. Curricular content in the form of courseware and textbooks
2. Library materials that enable students to expand the breadth and depth of learning.

Curricular content has been and, to a large degree is still, the purview of the faculty member teaching a class. Traditionally faculty members would use a core set of materials, usually a textbook, and then augment or adapt their materials to further enhance the actual instruction. Advances in telecommunications technologies have provided access to new student markets and demands for service from additional populations unable to physically attend classes. To be done well, the process of developing content for delivery over the Internet or via video can be expensive and lengthy. Development has been viewed as a significant drain on technology funds. A far cheaper and easier route is to purchase a pre-developed course much like a textbook or telecourse and adapt the materials for campus use. The Florida Community College Distance Learning Consortium has consolidated the licensing of instructional content successfully since its creation in 1996. Specifically, the Consortium has saved

approximately 50 percent or more over the individual institution costs by combining purchases and leveraging resources to make upfront buyouts of high use course content. In the area of information technology training where the course content may change rapidly, the Consortium has achieved favorable results in state-level master agreements for IT courseware by working with individual institutions to pool their resources towards larger purchases in order for all participating institutions to receive the benefits of large volume discount pricing. A key distinction between licensing and development activities is that licensing curricular content for use becomes an ongoing expense while development has been viewed as one time up front cost. The truth is that any course whether developed from the start or one that is licensed and adapted requires revision within a year or two. So in the long run, development can cost more up front and still not free the institution from the later maintenance cost. When considering the build versus buy decision for curricular content, the stability of the content over time and the number of students that the cost can be applied against are critical factors.

Similarly, digital content in the form of databases of journals, periodicals and other primary source material represent a highly valued resource for students and faculty. Access to sites that aggregate digital content is contractually licensed for a given period of time. The access cost can be a per student user rate or a flat fee enterprise-level license that recurs each contract period for continued access. Florida's Distance Learning Library Initiative and Georgia's GALILEO Project are two examples of state-level procurement of these digital resources for all students. In Florida, a certain set of core materials forms the basis for the funded agreement and individual institutions are free to purchase additional resources for their particular student base. As more of these digital resources are relied upon to fill student reference needs, a danger exists. There are no ownership rights provided and should funding become unavailable, access to the digital content would cease resulting in an immediate dilution of the materials available for student use. Not only could the quality of instruction be endangered but program or institutional accreditation could also be questioned if core reference materials were lost for certain educational programs. As a result, such funds and their connection to the institutions core mission must be protected as a part of basic continuation funding from year to year.

Faculty

Education is by its very nature a labor-intensive business. Faculty and staff are the core of any part of the enterprise and at the heart of many of its funding challenges. Recent estimates from Florida's community college system estimate labor costs comprise over 80 percent of institutional budgets. People are the most expensive part of any organization and effectively using this core resource to keep costs low is the hallmark of efficiently run educational institutions. At the center of many of the costing issues surrounding the faculty negotiated state and

institutional policies and contractual agreements that specify course load, student class headcount, office hours, and promotion requirements.

An accepted strategy for controlling costs is to teach larger section sizes of general education or lower division courses using teaching assistants or adjunct faculty to mediate the load on assigned faculty members. In the case of larger survey courses, a team teaching approach may be utilized again with the assistance of teaching assistants who meet with smaller groups of students in "lab" sections. Increasing the section size to spread the total costs of the course over more students allows an institution to amortize the upfront costs of acquisition or development. Collective bargaining agreements or existing contracts designed for application in the classroom environment often constrain this approach. Caps on student online enrollments of 20-25 are not uncommon. Further, required student-faculty contact hours include actual classroom and office hours when students could be assured of interacting with a faculty member teaching their courses. In online courses, the concept of student contact hours in actual practice includes the use of online chat sessions; responding to email and monitoring threaded discussion lists.

Students are more likely to increase their demand for interaction with faculty in the online environment. This phenomenon has translated into an increased workload and student "online" contact hours for faculty beyond the scope of the traditional classroom based environment. Requiring faculty teaching online to maintain regular physical office hours seems out of place considering the mode of instructional delivery and the regular level of electronic interaction. State policies and faculty collective bargaining agreements in terms of workload, and contact hours have not been redefined to meet the challenges presented by the electronic environment. Alternatives that might address these issues concern how individual faculty workload is calculated and managed. Current methods often calculate faculty workload based upon the number of students enrolled in a class with the assumption that the faculty member will provide a full range of services to those students. As instruction is "unbundled" the scope of faculty time devoted to supporting students can conceivably be lessened as other support services and staff take on those responsibilities. As a result, with proper staffing of student support services and the assistance of paraprofessional staff, individual faculty members or teams of faculty should be capable of providing instruction to larger numbers of students. Collective bargaining agreements and state policy can be revised to recognize ways in which faculty workload can be mitigated through proper support services.

Student Support Services

Decades of experience and research have validated the importance of student interaction and support services in the retention and academic progress of students. The costs for providing expanded or around the clock support services to students receiving instruction online are considerable. In order to meet those

student needs, the same technologies used to deliver the instruction can also be used effectively to engage and support students. One option for the creation of some of these support systems is to use one time or capital resources for the purchase of hardware and software systems for their delivery. Examples of such systems include call center operations, websites with frequently asked questions documents, online tutoring systems, electronic advising systems, and help desks for technical or library support. Such systems can be operated continuously such that assistance is routinely available to the student as needed. Although such technological solutions provide for some cost avoidance over traditional staffing patterns, the maintenance and labor costs are still an issue. Another common approach is to outsource many of these services to a private vendor with expertise in the specific service areas needed. Although such contracts with private business can be financially beneficial in the short term, they have met with varied levels of success. Perhaps the best solution involves collaboration among several institutions to provide or contract for a common menu of services to support their collective students. Costs and/or workloads can be shared among the participating institutions and particular institutional strengths in certain support areas can be exploited on behalf of all of the partners. Florida State University has an existing partnership with community colleges in the state to support its distance-learning students with a range of mentoring services. The university pays faculty members at the community colleges to provide mentoring services. The model has been very successful in both controlling costs and increasing student performance levels. The completion rate for students in the FSU online mentored programs during academic year 1999-2000 (fall, spring, summer) was 87%. The next academic year the completion rate was 93% (fall 2000, spring & summer 2001). The fall 2001 completion rate has continued the trend rising to 94%.

Structuring a New Landscape

The challenge to “keep up” with technological change requires new thinking about how we fund and conduct our schools, colleges and universities. Educational technology, as a primary or secondary method of instruction is often misunderstood and it can be an expensive proposition from initial funding through its continued operation. Because educational technology expenditures have been primarily viewed as capital purchases, policymakers often do not consider technology costs as recurring. As a result, such funding often arrives in the form of one-time special funding with no additional support for implementation or sustained operation. New ideas and methods of funding educational technology need examination as its utilization in our educational institutions continues to grow and change. Another aspect of the challenge concerns sustainability over time. Once funded, the costs involved in operating technology-based instructional programs can escape institutional control. There are several reliable methods that have been used to control the costs of instruction, regardless of the delivery method, that are worthy of re-examination. Although some of these cost containment strategies are not particularly new, their application to distance

learning and technology cost containment has not been as wide spread as that of traditional undergraduate education. Outmoded faculty workload policies that negatively impact the education business model need revision. Further, a better understanding of the nature of the changes underway and a review of proven funding and cost containment strategies is essential for policymakers.

- Technology use is growing across the education enterprise: Enrollment in distance learning courses and programs appears to growing steadily across the country. When "blended" or "mediated" courses are also considered, the scope of technological use and its relationship to core instructional activities is considerable. Continued reliance on email, web-based information delivery, content management systems, online advising, registration and student support systems and access to digital content will continue to place demands for technology funding upon institutional budget

- Education has become a multi-partner enterprise. Whether face-to-face in a classroom or delivered via technology, instruction has become an unbundled function that involves participants both internal and external to the institution. Depending upon the legal relationship, schools, colleges and universities are able to exert various amounts of control over the pricing, content, range of products and service providers that now comprise the new instructional model. As a result, education often involves partners from outside the academic enterprise where contractual relationships have gained a prominent role in how instruction is organized, managed and delivered.

- As a majority of technology costs settle in expense categories budgetary flexibility can be constrained. As more instructional content and services are licensed or outsourced, increasing segments of the instructional budget move to expense categories requiring annual renewal. With more of the education budget committed to private vendors for necessary services there is less room to adapt during difficult budget years. Budget reductions would mean that student access to digital content, the ability of institutions to maintain telecommunications circuits, leased equipment, licenses for curricular content or applications programs would be at some risk.

- Funding formulae should contain weights or multipliers for technology support. Three aspects of the formula issue should be addressed. First, removing any disincentive for distance learning in using only physically present students in the calculation of building construction and maintenance funding. Second, funding for physical infrastructure should include considerations for technological infrastructure as well as traditional bricks and mortar. Finally, since many of the technology costs for licenses, telecommunications circuits or computer workstations are

directly affected by student enrollments, any calculation of projected need should include a constant for technology expenses tied to enrollment growth.

- Costs can be significantly reduced through leveraged purchase at the state level or through regional or national procurement programs such as the AT Alliance. Infrastructure costs for telecommunications circuits, computer workstations, instructional content, and digital database access costs represent a necessary part of the instructional core of the institution and they are a growing part of the budget. Such costs are routinely incurred by educational institutions and therefore can be effectively mitigated by state-level procurement. Such efforts need not depend upon obtaining unanimous adoption of a particular platform or product. Within most large states, usage volume of many mainstream products and services is such that cooperative purchasing can bring about significant savings.

- Faculty and staff workloads and student support services must be managed in the face of the realities of the technology cost equation. In order to cover the costs of content acquisition and technology to deliver instruction, more students will need to be served. Staffing to accommodate additional workloads must be planned for in order to achieve favorable student achievement levels within costing factors that can be sustained.

- Collaboration is a powerful strategy for controlling costs: Institutions can control costs for developing content and services through collaboration. Specific individual institution strengths or expertise can be exploited on behalf of the group. Costs and workloads can be shared in providing student support or development services.

- Long-term contracts and licenses can help in cost avoidance. Long-term contracts for products and services have provided an opportunity to avoid significant cost increases in areas critical to the operation of the institutions. However, predictable increases in telecommunications capabilities and functionality among hardware and software vendors suggest that regular reassessment of technology policy and strategic direction should be done as significant shifts in the marketplace are detected. As a result, despite the financial incentives, careful consideration should be given before entering into multi-year contractual agreements for infrastructure related products and services.

- Redesigning courses is essential to managing the increased costs of instructional technology. The utilization of instructional technology within a course results in an additional cost factor that must be added to existing budgetary calculations. In order to manage the added expense, a fiscal

balance must be created for the overall costs of a course of program. Taking advantage of leveraged procurement of content, equipment or services, using telecommunications delivery to serve more students or utilizing technological tools to reduce the labor costs involved in instruction or support services can help offset the increased expense of instructional technology. In the absence of such a balance, the utilization of instructional technology would become unaffordable for most institutions.
