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Technology Procurement and Life Cycle Replacement Paper

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## **USC School of Music Computer Procurement and Life Cycle Replacement Introduction**

The University of South Carolina School of Music is a nationally recognized school within South Carolina's flagship state university. 80 faculty and staff serve 500 undergraduate and graduate music majors in over twenty degree programs and more than 1,500 university students from other disciplines.

Owens & Demb (2004) point out that "information technology fundamentally affects not only how the colleges function and who is served, but the very core of teaching and learning pedagogy" (p. 637). This is especially true here. Technology is essential to the mission of the University of South Carolina School of Music.

Technology implementation involves several different facets. These include computers hardware, computer software, computer infrastructure, computer support, instructional technology, and audio recording and computer music technology. While all interrelated, each of these requires special consideration and therefore they are divided into their own procurement and life cycle plans. This plan focuses on the computers hardware.

### **Computers**

Computers are what most people think of when they think of technology, and indeed computers are utilized in each aspect of the School of Music technology implementation. More than a decade ago the school standardized on the Macintosh computer platform. At the time, the Macintosh platform was the definitively better choice for music and audio applications. While the gap between platforms has narrowed significantly, there are still distinct advantages. Most importantly, the Mac platform requires much fewer support resources. According to Jason Trenary, School of Music IT director, he is able to support a "larger number of Mac OS computers with smaller staff" (personal communication, September 28, 2011) than he could if he needed to support PCs. In addition, Macs can utilize Windows OS using Bootcamp or virtualization software such as Parallels or VMWare. WinTel systems, however, do not have the same capability - they cannot run Macintosh software.

Computers are used in the School of Music in several overlapping categories. These include use in offices for administrative work, in classrooms for instructional use, and in technology studios for recording, composition, and audio production. Needs for office and classroom computer are fairly minimal. Any desktop computer released within the last 3 years will easily meet these needs. Faculty have similar or even less demanding needs - many faculty only need basic web and email access. A potential cost saving initiative currently being tested is to supplying faculty with an iPad instead of a traditional computer.

### **Special Use Computers**

The computer music and audio studios require higher-performance, more

specialized computers. A digital audio workstation (DAW) is an integrated hardware/software system for recording, editing, manipulating, and mixing digital audio. Current high-end state-of the-art systems utilize custom PCIe audio processing cards requiring a tower computer with multiple PCIe slots.

Digital Audio Workstations are some of the most demanding computer applications available. At any time, there may be several hundred audio files being accessed on several hard drives, each being individually processed thru various 'plug-ins' before being mixed together. The DAW can also support multiple 'virtual instruments', thru synthesis or sample-playback. DAW manufacturers typically provide detailed requirements of minimum and recommended systems. Typical requirements include fast processors, copious amounts of RAM, and large secondary hard drives with high spindle speeds and low seek times. Most of the manufacturers, such as Avid, do extensive testing of software/hardware combinations and explicitly state that they will not support unqualified systems.

Reliability is also a very important factor that cannot be read from a spec-sheet. These systems are used for recording, editing, and mixing recording of all performances in the USC School of Music, as well as serving as a classroom labs for recording courses. Students have access to the systems outside of business hours, so it is not uncommon for it to be in use 24 hours a day, 7 days a week. Because of this, the systems must be stable and consistent. Once a working combination of hardware and software is determined, it is only modified after much research.

### **Internal Funding**

Finding the necessary funding to keep technology up to date and to implement new technologies is a daunting task. Owens & Demb (2004) discussed that "essential technology is enormously expensive, and yet there appear to be few economies of scale in higher education", like those that exist in industry. Technology in education is not able to pay for itself. "Technology has not decreased faculty cost, nor are teaching and learning less costly." (p. 653).

This technology procurement and life cycle replacement budget will be funded from several sources. The School of Music receives funding (via the University as a whole) from student tuition, SC State budget appropriations, grants, auxiliary enterprises, and other sources. The School of Music budget has specific line items for technology support, replacement, and staff. In addition, a portion of the student Technology Fee (assess to all USC Students) allocated to the School of Music and earmarked for technology spending. Also, music students performing recitals may opt to have their recitals recorded - these funds go into the technology budget to offset technology costs of the recording and computer music studio computers.

### **External Funding**

Several additional avenues of procurement should be explored. Grants, from public and private sources, can be a useful way to supplement the technology budget. Since these grants are typically based around some research or creative endeavor, they are less likely to be used for general technology, but instead facilitate new initiatives and exploration of new technologies. Others may be more general and allow technology purchases where they are most needed. In 2009, the American Recovery and

Reinvestment Act ('the stimulus bill') allocated \$650 million to education technology (Wikipedia, 2011). \$8,000 of this was used to upgrade the Digital Audio Workstation and computer in the primary audio studio in the School of Music. Within the University, the Provost Office offers the Creative and Performing Arts Grant Program, which funds many faculty recording projects. A portion of the grant that covers the fee for the use of school recording facilities goes into the technology budget.

In addition to grants, the development director of the school seeks to secure donations from manufacturers of technology equipment. Many manufacturers and vendors provide special education pricing on hardware and software. Others will donate equipment that is one generation old. This equipment can then be upgraded to the current generation at a substantially reduced cost. The School of Music has seen technology donations over the past few years ranging from a complete Digital Audio Workstation to CD stereo units for all the faculty offices.

A side benefit of external funding is that it provides much of the same motivation and competitiveness as performance-based funding does. In Leifer's study of higher education resource allocation, he found that "the link between funding and performance leads to increased activity" (2003, p. 480). Faculty and staff who work hard to secure external funding also work hard to insure their program's success and increase the likelihood of receiving future external funding.

While external funding is important, the recurring internal budget must be sufficient to meet the support and life cycle replacement needs of the technology in the School of Music, since those funds are consistent and reliable. However, as the internal "resources that are allocated to the schools...are not linked to performance indicators...the decisive function of grants and contracts as well as tuition income forces faculty, researchers, and staff to be active in obtaining external funding. Therefore the stable and incremental allocation of institutional funds complements the uncertainties connected with external funding. (Leifer, 2003, p. 475)

Clearly, a two-pronged approach is the best solution; the School of Music must seek external funding in addition to internal sources.

### **Life Cycle Replacement**

Technology, especially computers, has a short life span. Hardware becomes obsolete long before it 'wears out'. As Wierschem and Ginther (2002) point out:

"The definition of useful life for computing technology has little to do with its physical capabilities and much more to do with software compatibility, communications capability, and maintenance. The costs associated with using computing technology past its useful life are prohibitively high in terms of dollars and personnel." (p. 53)

Because of this, part of technology planning involves replacement of technology that has completed its life cycle. A standard life cycle must be determined for computers, but it is important that this life cycle is reviewed as a part of the plan evaluation. "Regularly scheduled reviews and assessments of the IT infrastructure systems enable organizations to ensure that the technology integrated into their IT infrastructures continues to perform to expectations." (GTSI, 2002, p. 2)

For standard office and classroom computers, the life cycle is 3-years. Beyond this timeframe, the technology may still serve its user well, but changes in system and application software will place a burden on support staff. Each year, one-third of the standard computers will be replaced on a rotating basis, so that machines should have seen three years of use at the time they are retired. Retired computers shall be transferred to S.C. State Surplus.

Standard classroom computer shall be the entry level iMac with expanded memory. Standard office computer shall be the equivalent of entry level MacMini with expanded memory. Standard office tablet configuration shall be entry level Wi-Fi only iPad.

Due to the unique nature of the recording and computer music studio computers, these will have a different life cycle. These computers tend to be more expensive purchases and, as such, should provide longer service. Also, as stated earlier, reliability and stability are essential and configuration is more extensive, so replacement is far from trivial. Often times changing the studio computer requires changing audio hardware as well, so this must be considered as well. Typical life cycle for recording and computer music studio computers will be 4 years. Each year the Music Technology Committee will review the current status of these computers and their associated audio hardware systems. In years when these computers are not replaced, the technology budget line item associated with the recording and computer music studio computers will be rolled over into the following year's budget to amass funds for these expensive purchases.

### **Evaluation**

As with any plan, it is important to evaluate the success of the implementation. While it is easy to confirm that technology has been replaced as indicated in the plan, the effects of the technology are harder to measure. The ultimate goal of any initiative at a university is education, but it is a challenge "to be able to attribute student success to different technology enhancement options. Cost versus benefit is not an easy phenomenon to evaluate" (Owen & Demb, 2004, p. 663). Other factors that should be examined are awards of grants, reliability of systems, and development of new technology initiatives. In addition, students and faculty should be surveyed to assess their use of and satisfaction with technology systems.

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