University Classroom Committee
Report
To the Provost

2009 – 2010

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UNIVERSITY CLASSROOM COMMITTEE
REPORT
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Executive Summary

- The annual budget allocation for physical improvements to University classrooms is $500,000. The Classroom Committee endorsed allocating $250,000 from the FY2010 and $250,000 from future FY2011 funding for a major renovation of Ryan Auditorium to include new seating, flooring and replacement of general room lighting. Of the $250,000 remaining in the FY2010 budget, $183,000 has been allocated for renovations and/or equipment in Kresge, Tech, Frances Searle, Lunt, and the "Rock" plaza.

- As of Fall 2010, NUIT Academic and Research Technologies (A&RT) is supporting 113 general-purpose, technology-enhanced classrooms on the Evanston campus (compared to 101 classrooms that were supported in the fall of 2009). This brings the number of laptop-based technology-enhanced classrooms to seventy-nine (79) and resident computer-based classrooms to thirty-four (34).

- The University allocated funding to purchase 25LIVE, the web-based scheduling component that complements the current R25 room scheduling software used by the Office of the Registrar, and X25, a reporting tool that pulls data from R25 (or 25LIVE). Planning for implementation of these software programs is underway. Completion is anticipated in (date).

- The Classroom Committee met with the strategic planning workgroup on teaching, learning, and assessment to provide input as part of the University's strategic planning process. With technologies like lecture capture, online courses, and various Blackboard tools, learning extends well beyond the classroom into a variety of spaces. After the University's strategic plan is formulated more concretely in Fall 2010, the Classroom Committee will review the recommendations and directions in the plan, and assess how the Committee can best support the plan in its future work.

Use of the FY2010 Budget Allocation

The budget allocation for FY2010 classroom renovations is $500,000. The Committee endorsed allocating $250,000 from FY2010 funding and $250,000 from FY2011 funding for a major renovation of Ryan Auditorium, to include new seating, flooring and replacement of general room lighting. Listed below is the allocation for $183,000 of the $250,000 of remaining FY2010 funding. All projects listed below were completed by the start of Fall classes (September 2010).

- Tech LR2 & LR3: provide and install lecture capture equipment.

- Kresge 2-410, 2-435, 4-365, 4-430, Frances Searle 2-107, Lunt 105 & Tech MG28, A110, M128, M152, M164, M177, L251 (total FM support work for 13 rooms for AR&T). This is a joint project between Academic & Research Technologies and Facilities Management. AR&T has funding for AV equipment; the Classroom Committee is funding FM to provide facilities work in each room to support the AV equipment installation. Typically this consists of: new screens, addition of power and data outlets, low voltage pathways for AV equipment cables, reswitching of light and installing low voltage switches in rooms that have motorized screens.

- Kresge 2-410, 2-435, 4-365, 4-430, Frances Searle 2-107, Lunt 105 & Tech MG28, A110, M128, M152, M164, M177, L251: Classroom Committee approved the purchase of document cameras (also known as Wolf Visualizers) for each classroom.

- A picnic bench (table and attached seats) will be placed in the plaza in front of The Rock to discourage the removal of indoor classroom furniture from University Hall, Harris Hall and Kresge Hall.

- Relocate West Sheridan Classroom (WSC) 250 tables and chairs to Kresge 2-435 and Parkes 213. Since tablet armchairs in 2-435 & 213 are newer, tablet armchairs with larger writing tablets will be added to general-purpose classrooms at Kresge and Tech to fill in as needed, and sometimes to add an extra chair where it would be helpful. Tablet armchairs with smaller tablet arms will also be taken out of service to storage or relocated elsewhere on campus (15 to Shepard Hall).

- Tech LR4, LR5, M152, M164, M345: add power outlets for 50% of seat capacity in each classroom to provide support for students who bring their laptop computers to class.

Please see Appendix I for a list of all proposed projects for the balance of FY2010 funding.

Status of Technology-Enhanced Classrooms

New Technology-Enhanced Classrooms

West Sheridan Classrooms (WSC)

During FY10, four West Sheridan rooms (231, 232, 250 and 260) were fully outfitted as laptop-based classrooms, each with a Visualizer (digital document camera). Because of the room's larger size and expected event use, room 250 was additionally equipped with a 16-foot projection screen, a 720p native resolution projector, Blu-ray player, and multiple microphones for voice enhancement.

Starting spring quarter, WSC 250 was removed from the Registrar's inventory of general-purpose classrooms, and converted to a graduate student commons room. Because the Visualizer is considered an important teaching tool, A&RT re-purposed it from WSC 250 to Lunt 105 as part of the larger project to "refresh" twelve resident computer-based, Registrar-scheduled classrooms.

Harris Hall

Harris Hall, scheduled to be reoccupied in late Fall 2010 after major renovation, will include six technology-enhanced general-purpose classrooms, to be scheduled by the Registrar.
Four of these rooms are equipped as a laptop-based model with a Visualizer.

- L04 and L05 each seat 22 persons at tables arranged in a square.
- L06 and L28 each seat 22 persons and are equipped with movable tablet armchairs.

Harris L07 is equipped as a resident computer-based model with voice enhancement, Visualizer, an HD camera, and a capture device to support NU's Lecture Capture service.

- This room seats 82 persons and is equipped with movable tablet armchairs including four wheelchair positions.

Harris 107 is equipped as a resident computer-based model with voice enhancement, Visualizer, a Blu-ray player, two HD Cameras, and a capture device to support live streaming and NU's Lecture Capture service.

- This auditorium seats 300 persons with fixed tablet armchairs including two wheelchair positions.

None of the new Harris classrooms includes a VHS player (rarely used in classrooms at present). However, at the podium there is an option to connect a VHS player to the system.

The Harris classrooms are outfitted with chalkboards (rather than whiteboards), at the request of faculty who teach in these rooms.

WCAS Classroom, Kresge 2-380

At the request of WCAS, the Office of the Registrar now schedules Kresge 2-380 for academic courses on weekdays until 3 PM. After 3 PM and on weekends, this classroom is used primarily and scheduled by WCAS Humanities Institute.

The Classroom Committee approved appropriate system modifications to the podium equipment in Kresge 2-380 to conform to the standard classroom model. A&RT staff performed the necessary improvements at no charge so no new costs for Classroom Committee funds were associated with the upgrade. Since the completion of these modifications in March 2010, A&RT has supported the technology in this "shared" classroom.

Elder Residential Community

Responding to a proposal to develop a social and programmatic structure that will affect residential and campus life (i.e. "Master Plan for Creating a New Northwestern Residential Experience: A Residential and Campus Life Initiative"), and with the planned renovation of 600-610 Lincoln Street and Elder Hall, the University funded the creation of two technology-enhanced seminar rooms at the newly renovated Elder Hall Residential Community. Both rooms will be scheduled by the Office of the Registrar and supported by A&RT.

The larger of the two rooms, Elder 30, seats 25 and is designed as a multi-purpose, laptop-based seminar room with added technology and furniture to support and encourage team-based learning and collaboration. This space includes a WXGA (720p) projector, a 65" 1080p LCD display, three CopyCams (digital whiteboard-image capturing system), and laptop connectivity. It also includes touch panel controls, system monitoring, and security measures to prevent theft.

The second room, Elder 32, seats 20 and is a modified version of a laptop-based seminar room. This multi-purpose teaching space includes flexible furniture and technology that supports and encourages collaboration, including a 65" 1080p LCD, two CopyCams, and laptop connectivity. This room also includes touch panel controls, system monitoring and security measures.

Hardware Refresh in Existing Technology-Enhanced Classrooms during FY10

Tech LR2 and Tech LR3

The Classroom Committee funded the installation of a lecture capture system for these two technology-enhanced classrooms. This upgrade included the installation and integration of a new HD camera, a lecture capture device and software, plus system and audio upgrades to support and to make use of the existing microphones. This new feature was available in both classrooms beginning in Fall quarter, 2010.

Refresh of Equipment in Twelve Existing Classrooms

Other upgrades include the refresh of twelve existing technology-enhanced classrooms equipped with resident computers. These improvements include:

- WXGA (720p) wide-screen projector
- Visualizer
- Mobile podium (updated from a fixed style)
- New touch panel display
- Electronics that support HD connectivity options. (i.e. DVI, Mini DisplayPort, and Blu-ray)

To save on costs, where possible, the existing electronic components were re-purposed.

Classrooms Refreshed During 2010

Frances Searle 2-107	Kresge 4-430	Tech M152
Kresge 2-410	Lunt 105	Tech M164
Kresge 2-435	Tech A110	Tech M177
Kresge 4-365	Tech M128	Tech MG28

A thirteenth room, Tech M120, was outfitted with a new projector; it did not require additional improvements at this time.

Lunt 105
The Math Department (WCAS) requested that the technology in Lunt 105 be updated, improved, and remain a resident computer-based model. With an additional $15,000 allocated by the Classroom Committee, and in partnership with Facilities Management, the media and presentation technology in this room was updated to a current model, including the removal of a fixed, over-sized podium. A new mobile podium was installed, as well as updated infrastructure to support HD sources, a Visualizer, and a WXGA (720p) projector.

Visualizers
Visualizers were added to 19 classrooms. With these additions, almost half of the Registrar-scheduled classrooms (46%) are outfitted with this popular and frequently-requested tool.

Resident Computers in Technology-Enhanced Classrooms
All Evanston Campus technology-enhanced classrooms with resident computers were updated to dual-operating systems by fall quarter 2009. These machines bring platform flexibility to presenters in 34 classrooms while conserving podium space and energy use. Starting fall quarter 2010, all classrooms with resident computers were updated to the newest version of the operating system including Mac OS X 10.6.4 for Apple and Windows 7 plus Microsoft Office 2010 for PC. A full range of software options is available irrespective of the chosen operating system.

Using the Network to Monitor the Technology-Enhanced Classrooms
All technology-enhanced general-purpose classrooms supported by A&RT are monitored by a network-based management system. This enterprise software provides remote monitoring of the technology sources in classrooms; allows immediate on-line support and troubleshooting by staff; scheduling of system shutdowns to conserve expensive resources; provides added security, as well as a feature that manages collection of statistics on equipment usage.

Security in Technology-Enhanced Classrooms
The results of our efforts to secure equipment in technology-enhanced classrooms with alarms, steel cables, locks, and network-monitoring software have proven beneficial. There were no thefts of technology from general-purpose classrooms for the third year in a row.

Videoconferencing in Tech L251
Tech L251 is a general-purpose technology-enhanced classroom, supported by A&RT. A refresh of the existing technology was planned for FY 2010. Separate from these planned improvements, the University funded an initiative to add HD videoconferencing, live streaming, and lecture capture service to this classroom.

Starting in Fall 2010, Tech L251 will function as fully collaborative videoconferencing space with high-end audio, resident computer, Visualizer, Blu-ray player, lecture capture device and associated software, and voice-enhancement. The new WUXGA projector supports Full HD (1080p).

This 55-seat classroom is tiered and outfitted with fixed tablet armchairs. The upgrade was completed in September 2010 and the room is available for use by all academic departments. This classroom continues to be scheduled by the Office of the Registrar and supported by A&RT.

Surveying Faculty on their Technology-Enhanced Classroom Experience
Every quarter, A&RT surveys faculty registered to teach in technology-enhanced classrooms, requesting feedback about their classroom experience. The survey data provide metrics to assess the operational quality of these classrooms. This feedback also helps the Classroom Committee track faculty usage patterns and the demand for new technology enhancements.

Survey results for FY 2010 yielded a total of 451 responses, a response rate of about 20 percent. Eighty-two percent of the faculty using technology in a technology-enhanced classroom indicated they were "satisfied" or "very satisfied" with existing equipment. The response rate of 20 percent and percentage of reported satisfaction have been statistically consistent for the past three years.

The few common concerns expressed by faculty who were "less then satisfied" with their experience include: a frustration with a lack of a resident computer in the classroom where he or she was assigned to teach, and with both the presence and the absence of

wireless in the classroom. Additionally, there were numerous requests to add connectors or "pull-out" cables at the podium to accommodate the various digital laptop connectors (i.e. DVI, HDMI, DisplayPort, Mini DisplayPort) so the faculty member would not have to bring an adaptor to connect to the VGA cable. Please note that VGA has been the analog standard for many years.

There is not one standard for a digital laptop connection. There are, in fact, as many as five types of connectors on the various laptop models. Addressing this last item in technology-enhanced classrooms was and continues to be a challenge. This issue additionally highlights an emerging trend related to digital "connectors" and copy protection of digital content (called HDCP). More is written about this issue in the section on emerging trends.

Survey data indicate that the usage rate of laptop computers in a room with a resident computer is nearly 60 percent, similar to usage rates reported last year. This information indicates that a significant number of faculty continue to use a laptop even when scheduled in a room with a resident computer.

Survey data for FY 2010 also indicates 45 percent of our faculty used Macintosh laptops in technology-enhanced classrooms, up from 32 percent who used Macintosh last year. Fifty-five percent used Windows laptops.

Each respondent with a negative comment or concern is personally contacted; every attempt is made to address and resolve reported issues and concerns in a satisfactory manner. Every individual scheduled to teach in a technology-enhanced Classroom is offered a one-on-one orientation on how to use the technology. Survey results regarding satisfaction for orientations show that 100% of respondents were highly satisfied.

Every call to the classroom support help desk (often referred to as 7-ROOM support) is answered by a student or a full-time staff member. If a faculty member requires immediate assistance at the time of the call, a student or full-time staff is dispatched to the classroom to assist. Results regarding the resolution of "immediate assistance" requests to the 7-ROOM help desk showed that 95 percent of respondents were satisfied or highly satisfied with the resolution of the request.

A&RT collaborated with the Searle Center for Teaching Excellence to modify this quarterly survey. The new survey questions were intended to explore why faculty do not take advantage of certain available technologies, and to better gauge how the technology can be used to support student learning. Unfortunately, the questions did not yield a high response rate, nor did they result in useful feedback from the few who did respond (e.g. 'make sure everything works'). The survey questions may need to be revised, or a different method employed to better understand faculty expectations of enhanced technology used in classrooms, and student learning.

A&RT Technology-Enhanced Classroom Support and Registrar R25 partnership

During FY 2010 A&RT continued work with the Registrar to provide improved service delivery, greater efficiency, and to attain the highest standards for accuracy in communication with customers. In FY 2009, A&RT received read access to the R25 room scheduling data, to streamline the process for orienting faculty who use technology-enhanced classrooms. In FY 2010 we used the working knowledge gained to develop tools which identify the next available open times in individual rooms and groups of rooms in a single step. This allows staff to quickly prioritize resources and to make more efficient use of time, and decreases incident response time. We also began to extract usable hard data on classroom technology use by correlating scheduling information with the data logs generated by the network-based management and monitoring system. To assure the accuracy of data commonly used by both the Office of the Registrar and A&RT, an effort is underway to leverage the R25 database as the central repository for this data.

Videoconferencing Services on the Evanston Campus
There were 72 videoconferences supported in Tech MG51 in FY2010. The McCormick School of Engineering, The Office for Research, and WCAS Psychology in coordination with WCAS Neurobiology and Physiology (NBP) are the most frequent users of this space.

Pancoe Auditorium, located in the Life Sciences Pavilion, supported 48 videoconferences in FY 2010. Biochemistry, Molecular Biology, and Cell Biology (BMBCB) and Neurobiology and Physiology (NBP) arranged a majority of these videoconferences. Both are departments of WCAS.

Swift Hall 107 was used for eight videoconferences during FY 2010, compared to five videoconferences during FY2009. WCAS Psychology was the primary user of videoconferencing service in this space. This room is heavily scheduled as a technology-enhanced classroom, which allows minimal opportunity to schedule videoconferences. Furthermore, the technology is limited. There are no ceiling microphones, which dramatically limit audience participation and restricted data sharing capability; it is simply not an ideal space for most collaborative videoconferences.

Management software allows A&RT to track the use of available videoconferencing services by schools and departments. System statistics show that across A&RT-monitored videoconferencing rooms, assistance was provided for 769 sessions. The more frequent users of these services include WCAS with 142 scheduled videoconference sessions and Engineering and Applied Sciences with 91.

Results for the videoconferencing services survey showed that respondents were highly satisfied in the winter and spring quarters. Surveys are sent to everyone who schedules a videoconference.

Lecture Capture
NU's Lecture Capture service continued in FY 2010 as a means to augment the classroom learning experience. Recorded lectures are posted to NU's Course

Management System to the course-specific site. Students are then able to review lectures from a computer or mobile device.

The NU Lecture Capture model, supported by A&RT, can be offered in many University campus environments including large lecture halls, small classrooms and seminar rooms with each space requiring varying levels of technology and support. Because each lecturer's requirements and goals are unique and lecture environments vary, A&RT staff continue to explore different procedures and work flow to create efficiencies and reduce costs in delivery of this service.

In FY 2010, NU's Lecture Capture was used to record a significant number of lectures for a wide range of departments across the University:

Department	Lecture
WCAS Chemistry 102	32
WCS Chemistry 103	27
NUvention	67
FSM Scientific Basis of Medicine	393
Heilborn Symposium	8
Buffett Center	13
Turning Point Conference	5
FSM Physiology	22
Total Lectures	**567**

As part of the evaluation of the Chemistry courses that were recorded, students were surveyed on their experience with lecture capture services. WCAS Chemistry 102, with an enrollment of 393 students, was held in Tech LR3. The survey feedback showed an overwhelmingly positive response and considerable success in use of this service. To read about this project and enthusiastic feedback from the students, go to: www.at.northwestern.edu/chemistry/chem-102-report.pdf
WCAS Chemistry 103, had an enrollment of 310 students and was also held in Tech LR3. To read similarly enthusiastic student comments from this course, go to www.at.northwestern.edu/chemistry/chem-103-report.pdf

Lecture capture, like any other tool, must be carefully implemented by faculty, so that it enhances, rather than detracts from student learning. Faculty must reflect on their learning objectives to ensure that the way they are using lecture capture is appropriate. The Searle Center for Teaching Excellence plans to develop a handout with strategies for effectively using lecture capture in teaching and, as more faculty use the service, may develop a workshop devoted to this topic.

Student Response Systems (SRS)
A&RT continues to promote the use of SRS ("classroom clickers") on campus. Towards that end, A&RT continues to offer technical assistance and consultation to faculty

members interested in using SRS or "clickers" in the classroom. A&RT also maintains several informational webpages within the NUIT website for faculty and staff to use for installation and usage instructions. (http://www.it.northwestern.edu/srs/)
During FY10, 901 clickers were purchased from the NU bookstore.

A&RT and the Searle Center for Teaching Excellence hosted a regional user conference in March 2010. One-hundred and fifty participants from a variety of universities attended sessions and participated in hands-on workshops. Conference highlights included Dr. Eric Mazur's interactive keynote session "Introduction to Peer Instruction" and the Searle Center's full-day TLT Workshop "Designing Questions to Build Student Engagement" presented by Martina Bode, Denise Drane, Mary Schuller and Susie Calkins. Twenty-four attendees, including 11 NU faculty members participated in the workshop, and rated the session as highly useful in developing clicker questions that promote higher order thinking and student engagement.

Innovative Teaching Grants
This year, the Searle Center for Teaching Excellence awarded an innovative teaching grant to Janet Chang, Department of Economics, to help her introduce clickers (SRS) into her classroom. Working in groups, her students created high-level critical thinking "clickers" questions to pose to their peers. We will ask Janet to present her findings, either in a brownbag series hosted by the Searle Center, or in connection with A&RT's discussion series.

Teaching, Learning, and Technology (TLT) Program
In collaboration with Academic and Research Technologies (A&RT), the University Library, and the Searle Center for Teaching Excellence, the Teaching, Learning, and Technology (TLT) program is designed to help faculty integrate the tools of technology into their teaching. TLT underwent a substantial structural change this year. It is no longer one week-long intensive program. Faculty and grad students had the option to attend as many or as few sessions as they liked. There were six sessions, two of which were repeated due to high demand. A total of 118 people participated, with only a handful attending multiple sessions.

Teaching, Learning, and Technology Workshop Series (2010)

Workshop	# Participants	Average rating (5.0 scale)
Alternatives to PPT Session 1	18	4.07
Alternatives to PPT Session 2	13	4.00

Collaborative Projects with Bboogle Session 1	14	4.5
Collaborative Projects with Bboogle Session 2	10	4.42
Mapmaking and Learning	13	4.37
"Clickers" in the classroom (TP conference)	11 NU faculty of 24 total attendees	n/a
Alternatives to the Research Paper	12	3.60
Simulation and student learning	14	4.67
Totals	**118**	**4.23**

Emerging Classroom Technology Trends

Wireless Access in the Classrooms
In Fall 2009, an assessment of wireless network access indicated coverage for a total of 36 Registrar-scheduled general purpose classrooms. In a number of cases, coverage bleeds into the classrooms from access points outside the classroom.

Some schools and departments have expressed an interest in having reliable wireless coverage in all technology-enhanced classrooms. To that end, the Classroom Committee considered a proposal to add 24 access points to locations in the Tech Institute to extend wireless access to seven additional classrooms. Input from faculty who use the Tech classrooms suggested that, while some faculty supported wireless access in University classrooms, other faculty opposed it equally strongly. Thus, the Classroom Committee chose not to approve the proposal during FY2010.

With wireless access available in so many classrooms, the Committee discussed how this technology, which presents both an opportunity and, in some cases intrusion (e.g. during tests) is best managed. The Committee agreed that controlling use of wireless devices during class periods is a "classroom management" issue. The decision to allow access to the Internet and other wireless services and mobile devices (i.e Smartphone, iPad, Netbook) during class-time must be determined and managed by each individual faculty member.

Tablet Computers
Tablet devices such as the iPad or iPhone are full-function computers without a "physically" connected keyboard. These devices come with a slate-like enclosure that is thin, designed to be as easy to use as possible, and typically connect to the network using

a wireless or a cellular connection. They are lightweight, powerful, have a long battery life, terrific graphics, are e-reader capable and affordable for students and faculty.

Since the iPad's introduction in the United States market by Apple Computer on April 3, 2010, sales of this device have topped three million. Google, Dell and Microsoft will be releasing tablet or slate model computers within the next six months, or sooner.

We are just beginning to access and evaluate this new generation of computer and consider the implications of the rapid adoption of these and the variety of mobile devices by our students, and the impact this will have on our classroom infrastructure and teaching and learning at NU.

Next year, Mike Smutko, a faculty member in the department of Physics and Astronomy and recipient of the Charles Deering McCormick Distinguished Lecturer award, will be facilitating a University Teaching Roundtable (UTR) on the topic of mobile devices in the classroom. He will be presenting his results from a study that he conducted with a colleague in Psychology on how having wireless in the classroom impacts student learning, and will discuss strategies of classroom management.

HDCP
High-bandwidth Digital Content Protection (HDCP) is a new copy protection standard to prevent copying of digital audio and video content as it travels across digital connections (i.e. DVI, HDMI, DisplayPort, Mini DisplayPort). These digital connectors are standard on all new Macintosh and PC computers and have replaced the VGA (analog) connector found on older models. VGA had been the industry standard for many years and is currently used for laptop connectivity in all Technology-enhanced Classrooms.

As newer laptops come with digital connections, compatible connectors must be made available in the Technology-enhanced Classrooms. Additionally, we must have an HDCP compliant infrastructure (podium equipment, cabling, display devices) to ensure that protected content can and will display on any digitally connected device (e.g. computers, flat-panel displays, projectors, Blu-ray players). Devices with VGA can still be used, but won't display protected content at all, or will display at a significantly degraded resolution.

The Harris classrooms, the Elder Residential Community seminar rooms, the 12 refreshed rooms, and Tech L251 have each been updated. All have new laptop connectors (i.e. DVI and Mini DisplayPort) and are fully HDCP compliant. If the specific digital laptop connector is not available in a given Technology-enhanced Classroom, faculty will have to bring an adaptor, which are inexpensive and readily available.   The existing VGA connector will remain in all NU Technology-enhanced Classrooms and continue to be supported during this transition to a digital infrastructure.

Please note that a majority of existing media content is not HDCP protected. However, providers of newly produced HD content have universally adopted this copy protection format.

Eighty-two percent of existing Technology-enhanced Classrooms remain non-HDCP compliant. This new and emerging standard was not considered or included in the estimated costs to refresh and maintain classrooms. We are investigating how this new technology affects the cost of upgrading NU Technology-enhanced Classrooms.

Classroom Utilization

During the 2009-2010 Academic Year, the Utilization Subcommittee has focused on:

- The effect of the new Scheduling Guidelines on utilization;
- Efforts to increase the number of departments using R25 for scheduling so that a database is available for analyzing departmentally scheduled seminar/classrooms along with the Registrar's classroom inventory;
- Review of the X25 module for reporting off of R25 data;
- Seat utilization in relation to appropriate classroom sizes, with identification of Kresge as meriting particular focus.

Efforts of the Utilization Subcommittee over the next year will continue work on the items above, particularly focusing on development of recommendations for resizing Kresge's classrooms. As part of the renovation study currently underway, the Utilization Subcommittee will also need to consider the impact of taking Kresge off-line for renovations, along with options for handling this classroom need until the renovations are completed.

An outcome of the past year's discussions has been increasing recognition that classroom utilization needs to incorporate the broader use of these spaces for supplemental curricular and non-curricular activities that have not consistently been captured, whether in the R25 database or myriad scheduling systems across the University. Separate from the Registrar's scheduled use of classrooms for courses, at this point there is little understanding of how these spaces and departmentally scheduled spaces are being used for other activities, events and meetings. Adoption of R25 across units, combined with implementation of the X25 module, would do much to provide the database for a more complete view of space utilization.

Scheduling Guidelines

Analysis of data for the 2009-2010 Academic Year reveals that the scheduling guidelines adopted in 2008-2009 continue to have a positive effect on Classroom Utilization. For the second year in a row there has been a more even distribution of classes across the "prime" hours of the day. During that portion of the day (10 am to Noon, and 1 pm to 3 pm) utilization averaged between 65-75 percent with no significant drop off over the lunch hour. The Spring quarter did show a bit of a drop in the Noon to 1 pm time slot, but it also had considerably fewer class events (2,295 versus 2,722 in the Fall and 2,691 in the Winter).

Factors underlying the reduction in class activity during Spring quarters were considered and most likely include the following:

- Required classes, especially for freshman, pushed to the beginning of the academic year;
- Graduate students performing internships;
- Study abroad programs in the Spring;
- Faculty on leave;
- Lower enrollment by the end of the academic year.

While some of these factors are only known anecdotally, the effect of shifting class activity earlier in the year does have an impact on utilization efficiency. A better distribution of class events across the academic year would undoubtedly reduce pressure on the scheduling process, increase the availability of rooms during preferred teaching hours, and help adjust to potential reductions in the number of classrooms in the future, whether due to renovations or repurposing.

Another aspect of utilization that the new guidelines have not addressed is the extreme low utilization between 8 and 9 am (averaging 9%, and down 2% from '08-09), and the drop off in utilization between 3 and 5 pm. A significant amount of Registrar-controlled teaching space is idle for three hours during the day in all academic terms, as represented by these low utilization numbers. This represents a considerable space resource that is always available, yet rarely accessed.

Expansion of R25 Usage

As classroom utilization analysis plays an ever-greater role in the planning and apportioning of University facilities, the Utilization Subcommittee has emphasized the limitations of available data. Of the hundreds of classrooms, seminar rooms and other spaces where courses and meetings and events could occur on the Evanston campus, only a fraction are scheduled through Resource 25, which is the scheduling system used by the Registrar's office and the starting point for all classroom utilization analyses. Diverse scheduling arrangements seen across departments include: hand-written ledgers, Meeting Maker, Microsoft Outlook, unique software creations, and ad hoc use of spaces. Collection and collation of information from all these disparate sources is very difficult and time consuming to create a database useful for analysis. Without a broader set of data, it is impossible to have an accurate understanding of how well the University's space resources are being employed, and likewise difficult to formulate recommendations for improving utilization.

During the last academic year, efforts have been underway to educate schools and departments about R25, and encourage them to adopt it for departmental scheduling. Improvements in the R25 system, including object level security and web access, make it increasingly useful for broad application, allowing departments to retain individual control of their room schedules. Use of R25 across the University would make scheduling data accessible across academic and administrative units for greater ease in finding available rooms, and would result in one database as the resource for analyzing and understanding how needs can be better matched to spaces and locations.

University Purchase of 25Live and X25

In June 2010, the University allocated funding for the purchase and implementation of 25LIVE, the web-based scheduling component of R25.

At the same time, the University approved the purchase of X25, the reporting tool that pulls data from R25 (or 25LIVE). This tool collects "snapshots" of scheduling data for each term, including historical data, and provides numerous standard, useful reports. Accessible via the web, it will allow for easier analysis and efficient distribution of reports to the schools, departments, and administration.

This tool will be helpful to the current work of the Classroom Committee and the needs of Facilities Management in tracking classroom usage, as well as to other users of the scheduling system, as noted above.

[Note: Who is hosting – NU or CollegeNet?]

The Office of the Registrar, working with NUIT Management Systems (ITMS), is planning the implementation of this software.

Seat Utilization and Classroom Size

Analysis of Evanston's classrooms in relation to capacity and seat utilization has identified a number of spaces with historical efficiency problems. Kresge Hall, in particular, stands out with a number of rooms for which the maximum and average enrollment in any term falls far short of capacity. On the other hand, there are also a number of rooms in Kresge Hall that are occasionally used beyond their intended capacity. Average Seat Utilization for Kresge Hall is only around 50 percent even though average Room Utilization is the highest of all buildings at almost 79 percent. With renovation of this highly-used building in the near future, a better mix of appropriately-sized rooms will be possible to achieve with careful programming.

The classrooms in the University Library represent a continuing target for improvement. These small rooms with the highest seat-utilization (15 seats each, averaging 71 percent seat utilization) are both poorly located and improperly suited to teaching. For these reasons, they are the most underutilized of the Registrar classrooms.

With over 60 percent of classes at Northwestern University enrolling fewer than 20 students, it would be well to find a number of more suitable, small classrooms in easily accessible locations to serve the Registrar's scheduling needs. The question remains whether these spaces already exist in the form of departmentally scheduled seminar rooms, many of which may already be adequately utilized. However, documenting and analyzing this would do much to help understand the use of the spaces in the context of the number and size of classrooms required in the Registrar's inventory.

Classroom Committee Participation in University Strategic Planning Process

The Classroom Committee met with the strategic planning workgroup on teaching, learning, and assessment in order to better understand how it could align its goals with recommendations of the workgroup and, ultimately, the University strategic plan. The meeting was well-attended by members of the Classroom Committee; the workgroup was represented by Robert Gundlach, co-chair, as well as Bob Davis, Robert Taylor, and Ron Braeutigam who sit on both the Committee and workgroup.

Workgroup members gave the Committee members a brief overview of their discussions and preliminary recommendations for teaching and learning at Northwestern and then asked them to share their vision and high-level ideas. The discussion focused on the changing technologies of teaching and learning and their impact on the physical spaces and structures of teaching and learning. With technologies like lecture capture, online courses, and various Blackboard tools, learning extends well beyond the classroom into a variety of spaces. The Committee recognized that in order to continue its positive impact on teaching and learning at Northwestern, it needs to focus on multi-purpose learning spaces that may extend beyond traditional classroom settings, enhanced by up-to-date technology.

After the University's strategic plan is formulated more concretely in Fall 2010, the Classroom Committee will review the recommendations and directions in the plan, and assess how best the Committee can support the plan in its future work.

Goals for FY2011

- Develop a schedule for replacement of carpet, blinds, repainting, selected lighting and some furniture as many installations will pass the 10-year mark in summer 2011.

- Plan and implement appropriate level of laptop support. This could involve furniture modifications, addition of power outlets and possibly more wireless nodes (with potential help from NUIT).

- Continue funding millennium (remote access to unlock/lock classrooms to improve access to registrar classrooms).

- Determine how better to connect with large university initiatives, specifically the strategic planning and assessment processes, as those initiatives relate to teaching and learning in NU classrooms.

- More clearly integrate TLT workshops and other programs with the emerging technologies that NU supports to enhance faculty teaching and student learning in NU classrooms.

- In order to assure reliable and predictable audio and video playback and display of digital content in all technology-enhanced classrooms, A&RT will explore and consider submitting a recommendation to accelerate HCDP compliance and hardware upgrades in existing Technology-enhanced Classrooms.

- Focus on development of recommendations for resizing Kresge's classrooms to attain optimal utilization of space. As part of the renovation study currently underway, the Utilization Subcommittee will also need to consider the impact of taking Kresge off-line for renovations, along with options for handling this classroom need until the renovations are completed.

Appendices

I. FY2010 Approved and Completed Projects
II. Report of the Subcommittee on Classroom Utilization

reason for improvement	room	cap	sf	Description	Est. Cost	
Approved 2/18/10: Tech L165 AUD	Ryan Auditorium, LR1	602	8,918	Approved for summer 2011, est. 500k (50% FY2010; 50% FY2011): replace room lighting, flooring and furniture. (hold 250k from 2010 funding) Payback on lighting replacement would be $900/year; $2800 for 3 years.	**$250,000**	**$250,000**
lecture capture equipment	Approved 2/18/10: Tech LR2 & LR3	277	5,300	lecture capture set-up for 2 rooms (each room has 277 capacity/5300 sf)	**$20,000**	**$270,000**
Approved at 2/18/10 meeting: provide FM prep work to assist AR&T in upgrading 14 older technology-enhanced classrooms; document cameras for all 14 rooms endorsed at 5/6/10 Classroom committee meeting	Kresge 2410, 2435, 4430, 4365, Frances Searle 2107, Lunt 105, Tech MG28, A110, M120,M128, M152, M164, M177, L251			$50,000 for FM prep work to 14 rooms: 3 more data + wall phone near podium, security cables for new podium, move existing cabinet lock to new podium; for some rms: replace manual screeens, add low voltage switch for (exist) motorized screens, reswitch lights. AR&T account funds AV equipment. **5/6/10: Request approval for $3600 per rooom to add a Wolf Visualizers to all rooms. If it is not possible to add Visualizer to all then increase budget to add Visualizers to 4 Kresge rms. The add came after 2/18/10 meeting. Orig. budget: 75k, FM work only 50k; FM + Kresge only: 65k; FM + all=12 visualizers rooms: 101k.**	**$101,000**	**$371,000**
prevent borrowing of indoor furniture for use at the Rock; approved at 5/6/10 meeting; approved 5/6/10	"The Rock": need to request approval			Landscape forms "Mingle" picnic table with security cable at Rock plaza. This table was selected by NU-Landscape Architect and endorsed by ASG. Norris Center also wrote into rules of reserving the Rock that students are not allowed to remove furniture from buildings for use outside.	**$4,500**	**$375,500**
relocate WSC250 (Seabury) 28 tables & 42 chairs to other Registrar rooms; approved 5/6/10	Kresge 2-435 & Parkes 213			moving costs & purchase 18 chairs to fill in for some WSC250 furniture that TGS will keep; redistribute tablet armchairs from 2435 & 121 to rooms needing replacement or additional seating and take out of service some tablet armchairs with smaller writing tablets for use hopefully elsewhere on campus. (for example likely use 15 of these tablet armchairs for a freshman seminar room at Shepard Residential College)	**$5,000**	**$380,500**
improve classroom functionality; approved 5/6/10	Tech LR4 & LR5	88	1,455	power for 50% of seats = 44 students x 2 rooms	**$20,000**	**$400,500**
improve classroom functionality; approved 5/6/10	Tech M152 & M164	60	873	power for 50% of seats = 30 students x 2 rooms	**$20,000**	**$420,500**
improve classroom functionality; approved 5/6/10	Tech M345	102	1,837	power for 50% of seats = 51 students	**$12,000**	**$432,500**
aesthetics- rooms need painting; 5/6/10: not endorsed	Kresge: all 18 classrooms			repaint rooms "revere pewter" (same 'fingerprint light gray' used at Annenberg, Tech, University Hall.	**$50,000**	**$482,500**

improve classroom functionality	Tech LR4 & LR5	88	1,455	4 wireless nodes per NUIT est. $1750 ea.x 4 nodes x 2 rooms	**$14,000**	**$496,500**
improve classroom functionality	Tech M152 & M164	60	873	3 wireless nodes per NUIT est. $1750 ea. x 2 rooms	**$10,500**	**$507,000**
improve classroom functionality	Tech L361 & M345	102	1,837	4 wireless nodes per NUIT est. $1750 ea. (L361 has power to each chair) x 2 rooms	**$14,000**	**$521,000**
improve classroom functionality	Tech M166, L158, L170, MG52			replace tablet armchairs with tables & chairs; moving costs to relocate tablet armchairs for use in other classrooms; need is 50 tables & 100 chairs for the 4 rooms.	**$50,000**	**$571,000**
improve classroom functionality	Tech M166, L158, L170, MG52			add power for 50% of seats - 100 students	**$22,500**	**$593,500**
improve classroom functionality	Tech M166, L158, L170, MG52			add 2 wireless nodes to each of 4 rooms per estimate by NUIT of $1750 each	**$14,000**	**$607,500**
provide split system=quiet air conditioning	Lunt 101, 102, 103			replace existing window a/c's with wall mounted Carrier split system units rated to operate in -20F temps.	**$70,000**	**$677,500**
request approval 1) reduce room echo 2) improve aesthetics & usefulness of 12 rooms	Library 3322 3370 3622 3670 3722 4622 4670 4722 4770 5322 5722 5746	15 ea.	270 ea.	acoustic ceiling panels, install projection screens, furniture type to be determined; estimated $10,000 per room	**$100,000**	**$777,500**
starting FY2011	replace carpet in several classrooms			Parkes (carpet replaced 2002, 6 rooms), Kresge (carpet replaced 2002-2003, 18 rooms). Cost to recarpet 1 average size room = $4000; there are 113 Registrar classrooms not including Harris Hall. Recarpet about 25 rooms each year for 4 to 5 years starting FY2011 until all rooms have new flooring.	**$115,000**	**$892,500**
starting FY2016	campus registrar rooms			replace fixed & loose furniture as needed based on program & survey needs; cost is per year for next 5 years.	**$115,000**	**$1,007,500**
reupholster thinning upholstery	Leverone Auditorium -	600	6,575	reupholster seats, need 3-4 weeks from graduation to Kellogg orientation	**$55,000**	**$1,062,500**
current exit lighting too dim	Leverone Aud.	600	6,575	upgrade existing exit aisle and step lighting	**$50,000**	**$1,112,500**
provide remote timed locking/unlocking	University Hall 11 classrooms:			University Hall 101,102,112,118, 121,122,218,312, 318,412,418; est about $6000/door for 13 doors	**$80,000**	**$1,192,500**
provide remote timed locking/unlocking	Tech see list at right			Tech Ryan Aud (8),LR2 (4) ,LR3 (4) est $5000 per door for 16 doors	**$80,000**	**$1,272,500**
provide remote timed locking/unlocking	Tech see list at right			Tech LR2 &LR3 projection rooms, LR4,LR5, A110,L150, L158,L160, L168, L170,M120, M128, M152,M164,M166,M177; est $5000 per door for 24 doors	**$125,000**	**$1,397,500**
provide remote timed locking/unlocking	Tech see list at right			Tech classrooms: MG28,LG52,LG62, LG66,LG68,LG72, LG76,L211,L221, L251, L361, M345, M349; est $5000 per door for 19 doors	**$100,000**	**$1,497,500**
provide remote timed locking/unlocking	Frances Searle 7 classrooms			1421,1441,2107, 2370,2378,2407; est $6000 per door for 18 doors	**$110,000**	**$1,607,500**

APPENDIX II
OVERVIEW OF UTILIZATION DATA FOR REGISTRAR CLASSROOMS

Below is the summary of information for the Fall, Winter and Spring Quarters, which is shown in greater detail in attached charts and spreadsheets, and compared with classroom utilization data from previous years:

Daily Utilization for all Classrooms scheduled by Registrar:
Comparison with Fall Quarter 2000, Winter Quarter 2000, and Spring Quarter 2000 (extrapolated from two Acad. Yrs.)
Comparison with Fall Quarter 2002, Winter Quarter 2003, and Spring Quarter 2003 (Acad. Yr. 2002-03)
Comparison with Fall Quarter 2003, Winter Quarter 2004, and Spring Quarter 2004 (Acad. Yr. 2003-04)
Comparison with Fall Quarter 2004, Winter Quarter 2005, and Spring Quarter 2005 (Acad. Yr. 2004-05)
Comparison with Fall Quarter 2005, Winter Quarter 2006, and Spring Quarter 2006 (Acad. Yr. 2005-06)
Comparison with Fall Quarter 2006, Winter Quarter 2007, and Spring Quarter 2007 (Acad. Yr. 2006-07)
Comparison with Fall Quarter 2007, Winter Quarter 2008, and Spring Quarter 2008 (Acad. Yr. 2007-08)
Comparison with Fall Quarter 2008, Winter Quarter 2009, and Spring Quarter 2009 (Acad. Yr. 2008-09)
Comparison with Fall Quarter 2009, Winter Quarter 2010, and Spring Quarter 2010 (Acad. Yr. 2009-10)

Utilization based on rooms scheduled for Fall, Winter & Spring (2009-10): average of 63.2% 9 to 5 daily;

Comparison: utilization between 1999 to 2005 dropped from 65% ('99-00) to 59% ('02-03) to 57% ('03-04) to 55.5% ('04-05), but subsequently increased to 57.4% ('05-06), to 60.8% ('06-07), to 63.1% ('07-08), to 63.3% ('08-09), and decreased very slightly to 63.2% last year.

Compared to previous years based on rooms scheduled 9 to 5 daily ('99-00 vs. '02-03 vs. '03-04 vs. '04-05 vs. '05-06 vs. '06-07 vs. '07-08 vs. '08-09 vs. '09-10):

Fall Utilization: dropped from 66% to 61% to 58.1% to 57.8%, increased to 59.3 to 63.2% to 64.1%, dropped to 63.3%, and increased to 64.5% in Fall '09.

Winter Utilization: dropped from 65% to 60% to 52%, increased to 58%, decreased to 57.5%, increased to 61.9%, to 63.9%, to 66.8%, and decreased slightly to 66.7% in Winter '10.

Spring Utilization: dropped from 65% to 56% to 54% to 51%, increased to 55.5% to 57.3% to 61.3%, decreased to 59.8%, and decreased to 58.3% in Spring '10.

For 2009-10 classroom utilization was highest during the Fall and Winter Quarters. Relative to trends and previous years, utilization for the Fall quarter increased slightly, while Winter and Spring utilizations decreased. The Spring decrease (-1.5%) was the biggest change, but was almost matched by an increase in the Fall (+1.2%). Overall, classroom utilization decreased slightly (-0.1%).

Data from Academic Year 2009-10 still shows improved distribution of classroom utilization throughout the day. It appears that in academic terms when there is greater pressure on classrooms, it rises in the most "unpopular" time-slots (9-10am and Noon-1pm). During terms with less pressure on utilization, it decreases in these same time slots. For the 2009-10 Academic Year, Fall had the highest utilization and Spring the lowest. In the Spring, the 9-10am hour was 15.7% lower and the Noon hour was 11.8% lower than in the Fall.

Daily Utilization for "Technology-enhanced" Classrooms scheduled by Registrar:

Comparison of Technology-enhanced Classrooms with "non-technology-enhanced" rooms was not performed this year, since all but four Registrar Classrooms (Lunt Hall 101, 102, 103 and 104) have received "technology-enhanced" upgrades.

Utilization of "technology-enhanced" classrooms 9 to 5 daily: Fall '02 @ 66%; Winter '03 @ 72%; Spring '03 @ 67%;
Utilization of "technology-enhanced" classrooms 9 to 5 daily: Fall '03 @ 65%; Winter '04 @ 64%; Spring '04 @ 61%;
Utilization of "technology-enhanced" classrooms 9 to 5 daily: Fall '04 @ 76%; Winter '05 @ 73%; Spring '05 @ 66%;
Utilization of "technology-enhanced" classrooms 9 to 5 daily: Fall '05 @ 71%; Winter '06 @ 70%; Spring '06 @ 68%;
Utilization of "technology-enhanced" classrooms 9 to 5 daily: Fall '06 @ 70%; Winter '07 @ 68%; Spring '07 @ 66%;
Utilization of "technology-enhanced" classrooms 9 to 5 daily: Fall '07 @ 69%; Winter '08 @ 68%; Spring '08 @ 67%;
Utilization of "technology-enhanced" classrooms 9 to 5 daily: Fall '08 @ 69%; Winter '09 @ 66%; Spring '09 @ 59%;
Utilization of "technology-enhanced" classrooms 9 to 5 daily: *(no analysis for 2009-10 Academic Year)*

Room Utilization by Building 9 to 5 daily:

In buildings with multiple classrooms scheduled by the Registrar, Kresge, 555 Clark and University Hall are the three building locations with the highest overall utilization: Kresge at 78.6% (compared to 79.4% in in '08-09); 555 Clark at 75.8% (compared to 63.5% in '08-09); and University Hall at 70% (compared to 76.2% in '08-09). Of the years for which we have data, Kresge has consistently been the building with the highest utilization. The highest average utilization for a building with multiple rooms in any academic year was Kresge in AY '07-08 when it was 81.1%. Although its overall average has decreased slightly in the last two academic terms, the average utilization for the last two Winter terms in Kresge have been the highest recorded (84% in '08-09 and 82% in '09-10). In buildings with only one classroom scheduled by the Registrar, utilization increased: Coon Auditorium {Lev. Aud} substantially at 60.8% (up 25.4% from '08-09); Pancoe Auditorium at 65% (up 7% from '08-09); and Swift Hall Lecture Room 107 at 70% (up1.1% from '08-09)

University Library, which has classrooms primarily with less than 20 seats, fell to 25.6% (compared to 26.6% in '08-09, 31.3% in '07-08, 25% in '06-07, 23.3% in '05-06, 21% in '04-05).

Based on Size of Room Scheduled: Up to 20 seats; 21 to 80 seats; 80 to 120 seats:

	'99-00	'02-03	'03-04	'04-05	'05-06	'06-07	'07-08	'08-09	'09-10
Up to 20:	52%	46%	43%	39%	45%	46%	48%	47%	49%
21 to 80:	65%	62%	60%	61%	66%	67%	66%	67%	68%
81 and larger:	62%	64%	61%	56%	64%	65%	63%	66%	70%

Utilization in smallest size category remains the lowest, though utilization continues a general increase in all categories. The greatest increase is in the largest size rooms, which show a 4% increase in utilization.

Seat Utilization based on the Size of Scheduled Classrooms:

Seat utilization represents the percentage of seats occupied when a room is used. While average seat utilization for rooms scheduled from 9 to 5 daily peaked in '03-04, seat utilization has typically been low. Classrooms with up to 20 seats (located in the Library) consistently have had the highest seat utilization.

	'99-00	'02-03	'03-04	'04-05	'05-06	'06-07	'07-08	'08-09	'09-10
Up to 20:	61%	57%	65%	66%	64%	64%	66%	64%	62%
21 to 80:	47%	45%	53%	49%	45%	47%	48%	49%	50%
81 to 120:	48%	51%	56%	53%	44%	46%	45%	46%	48%
120 and larger:	39%	39%	44%	43%	40%	41%	43%	44%	42%
Average	45%	47%	54%	53%	48%	50%	51%	51%	51%

For any classroom potentially targeted for a decrease in the number of seats, seat utilization specific to the classroom needs to be considered, along with options for shifting some scheduled courses into classrooms with a larger number of seats.

Enrollment Utilization for Fall, Winter and Spring Quarters:

Requested maximum enrollments compared to actual enrollments for courses scheduled 9 to 5 daily:

	'02-03	'03-04	'04-05	'05-06	'06-07	'07-08	'08-09	'09-10
Fall:	74%	79%	77%	73%	79%	73%	74%	79%
Winter:	70%	75%	71%	75%	79%	70%	73%	76%
Spring:	51%	74%	72%	74%	76%	72%	75%	78%
Average:	65%	76%	73%	74%	78%	72%	74%	78%

Standard vs. Non-Standard Scheduling

During the last several years a University policy encouraged standard scheduling roughly between 9 to 2 daily for courses that used classrooms scheduled by the Registrar.   Starting in '02-03, the impact was an increase in the percentage of courses conforming to standard scheduling. Standard vs. non-standard scheduling as defined by 4 types established in '02-03 began to decline after the second year of the policy, and was not enough to encourage a more even distribution of usage across the day. As a consequence new classroom scheduling guidelines were implemented during Academic Year 2008-09 that constrained the number of each department's classes scheduled during "prime hours" (10 am to 12 noon, and 2 to 4 pm).   With this change, the percentage of classes adhering to standard scheduling guidelines increased 3% over the first year and 2% in '09-10. Standard scheduling for the '09-10 Academic   Year   was   up   4%   over   the   6-year   average