UNIVERSITY AT BUFFALO
TEACHING, LEARNING & TECHNOLOGY TASK GROUP (TLT-TG)
FINAL REPORT
JANUARY 2009

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TLT TASK GROUP EXECUTIVE SUMMARY

The University at Buffalo Teaching, Learning & Technology Task Group (TLT-TG) was launched in January 2008 at the request of the Chief Information Officer and Director of Academic Services to advise the Capital Facilities and Space Planning Instructional Facilities Subcommittee on the role of pedagogy in future classroom (learning space) design and planning.

The task group co-chairs invited key university stakeholders to review existing data and participate in the creation of new data (including a joint TLT-DEGW survey as part of Master Planning efforts) to research how to best support pedagogy through technology-enhanced classroom learning spaces and instructional support services. These metadata were drawn upon to consider new pedagogical standards when designing or renovating future learning spaces. Following a comprehensive review of faculty and student needs, a TLT subgroup then conducted a detailed pedagogical audit of over 400 existing classrooms, culminating in a gap-analysis of existing classroom functions benchmarked against a new vision for future facilities and services.

The classrooms pedagogical audit found that of the unique spaces surveyed, roughly three-quarters of the centrally supported classrooms (n=132) contained existing technology (e.g., computer-enabled video display, touch screen control, etc.), but the inverse was true in departmentally supported spaces (n=264), where 75% had no resident technology available in classrooms.

TLT Task Group recommendations include the need for baseline, standardized technology in all UB classrooms in order to support and encourage active learning through student engagement. New budget and scheduling methods should be considered to make learning spaces available to faculty who require them on a flexible basis, coupled with significant professional development and support resources to assist faculty who are incorporating use of emerging technologies in their curricula.

The Teaching, Learning and Technology Task Group wishes to acknowledge the many hours contributed by a diverse group of campus faculty and instructional support staff. A strong spirit of cooperation was evident throughout this year-long effort, including that from colleagues at peer institutions (University of Minnesota and University of Wisconsin) who provided data that helped inform this work. Finally, we thank the leadership of Capital Facilities and Space Planning, the Teaching and Learning Center and Instructional Technology Support Services who made significant staffing resources available to complete the pedagogical audit on a very aggressive timeline.

Organized in a manner to succinctly present findings, the majority of detailed information is referenced in the appendices: task group membership, links to data resources, and a summary of subgroup meeting schedules and project deliverables. Questions regarding this report may be directed to Dr. Barbara Rittner or Dr. Lisa Stephens, TLT Task Group co-chairs, or Dr. Jason Adsit, Director of the Teaching & Learning Center.

BACKGROUND

The University at Buffalo Teaching, Learning & Technology Task Group (TLT-TG) was formed in January 2008 at the request of the Chief Information Officer and the Director of Academic Services to serve as an advisory group to the Capital Facilities and Space Planning Instructional Facilities Subcommittee.

The TLT-TG was charged with developing a comprehensive assessment of the university's teaching and learning spaces – with an eye toward identifying classroom configurations and technologies that will support and enhance teaching effectiveness. This report describes the year-long process of responding to the task group charge, finding and recommendations.

REVIEW OF LITERATURE AND EXISTING DATA[1]

The following existing data helped inform TLT work:

- University at Buffalo *Teaching with Technology* Faculty Survey (2007)
- University at Buffalo *Learning with Technology* Student Survey (2008)
- University at Buffalo Collaborative and Learning Space (CaLS) Report (2008)
- University at Buffalo Student IT Experience Surveys (2004-2008)
- University at Buffalo Instructional Technology Support Services (ITSS) Classroom Technology Faculty Satisfaction Surveys (2006-2008)
- UB Instructional Technology Support Services (ITSS) Classroom Technology Attributes Matrix
- EDUCAUSE ECAR Reports of Undergraduate Students and IT (2004-2008)
- Peer Institution Faculty and Student Survey Reports
  - University of Minnesota
  - University of Wisconsin – Madison

FACULTY FEEDBACK AND DATA COLLECTION

In addition to the review of existing data, the TLT conducted several studies to further understand faculty preferences for teaching with technology:

TEACHING, LEARNING & TECHNOLOGY: FUTURE CLASSROOMS SURVEY
Forty-five (45) newly-hired faculty members compared UB's technology classrooms and services with those of their previous institutions. This survey considered results from the University at Buffalo Teaching with Technology Faculty Survey (2007) – and requested feedback on just two qualitative questions, prompting participants to "think outside the box" and include ideas for creating simulations, incorporating various types of audio/visual support material, digital lecture capture, gaming, and discipline-specific software programs.
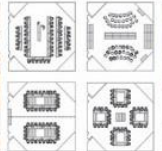
UNIVERSITY AT BUFFALO LEARNING SPACE FACULTY SURVEY
The TLT-TG partnered with architectural consultants from DEGW during spring/summer 2008 to design and deliver the University at Buffalo Learning Space Faculty Survey. The aim of the survey was to

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[1] *See appendix, page 13 for full references with links.*

gather information on "UB faculty preferences for learning spaces, pedagogy and course characteristics" with the goal of informing "the distribution of learning spaces at UB, as part of the UB2020 Master Plan initiative" (DEGW Report: 2008 UB Learning Space Faculty Survey, p. 2). This survey included photographs and descriptions of potential future classroom configurations and requested faculty to indicate their ideal course sizes and sections, technology needs and general concerns regarding current classrooms.

Palette of Learning Spaces

	Lecture Hall	Case Study	Learning Studio	Flexible Classroom	Seminar Room	Meeting Room	Technology Sandbox
Pedagogy:	Didactic	Hybrid / Discussion	Collaborative	Flexible	Conversational	Connective	Experiential
Description:	• Continuous counters with power for laptop use • Some with swivel chairs for breakout discussion • Wide teaching wall for 2 – 3 projected images	• U-shaped tiered seating with continuous counters and movable chairs • Wide teaching wall for 2 – 3 projected images • Continuous counters with power for laptop use	• Plan accommodates efficient alternative layouts • Movable furnishings • Multiple screens • Group project work capture	• Movable tables and chairs • Distributed power outlets in floor • All walls enabled, as white boards or projection surfaces • Collaborative software and systems to capture group products	• Non-hierarchical table layouts • Room proportions more square than rectangular • Walls enabled for group work • Simultaneous writing and projection • Dual image projection • Group project work capture	• All walls engaged in data display, multiple images • Ceiling grid for multiple projectors and devices in swappable locations • Capability to engage remote participants or network data, e.g. Access Grid • Additional space for supplemental devices	• Flexible infrastructure with good power and data distribution • Supports introduction of advanced technolgies, e.g. simulation, visualization • Movable furnishings to support multiple functions • Fit-up tailored to local need and purpose

"BLUE SKY" AND "MATRIX" SUB-GROUPS

The TLT-TG convened two sub-groups – comprised of faculty and instructional support staff from across the institution for multiple sessions to respond to the TLT charge:

- The "Blue Sky" Group was populated with faculty members and instructional designers who were familiar with emerging technologies and innovative instructional methods. The guiding question for the "Blue Sky" Group was, "If money were no object, what types of "out of the box" technologies should UB have available to support your vision?"

- The "Matrix" Group was comprised of instructional designers and classroom technology support specialists. The guiding task for the "Matrix" Group was twofold: (1) to review classroom services and technologies currently available on campus; and (2) to develop a new series of pedagogical standards that could inform future classroom planning and design efforts.

DATA ANALYSIS

TLT: FUTURE CLASSROOMS SURVEY DATA REPORT

Faculty hired at UB within the past three years offered some very clear response patterns:

- In order to best support a broad range of curricular needs, all UB classrooms (including centrally scheduled and departmental classrooms) should meet "minimal technology standards" so faculty can rely on baseline services and technology in all classrooms/learning spaces when developing curriculum;
- From a budgetary standpoint, incorporating basic technology into all classrooms should take priority over building specialized spaces to support narrower curricular needs; and technology should be adjunct to (not a replacement of) traditional whiteboards and chalkboards;

- Student response systems (e.g., "clickers") should be available in a sufficient number of classrooms across campus to meet faculty demand for the technology;
- Digital course capture (audio and/or video podcasting or video-on-demand) should be available in a sufficient number of classrooms to allow access to all instructors requiring its use for alternative course delivery or for tutorial/review applications;
- Videoconferencing and multiple desktop sharing software should be available to instructors seeking virtual lecture opportunities from outside experts – and to facilitate online collaborative research;
- Technology should be incorporated into all instructional settings – including dance studios, seminar rooms, screening rooms, and other specialized instructional spaces.

The data from this survey was remarkably consistent with findings from the larger campus-wide Teaching with Technology Faculty Survey (2007) – particularly in the area of classroom technologies. In the Teaching with Technology Faculty Survey (2007), 82% of respondents indicated that increasing the number of technology-rich classrooms should be a moderate-to-high budget priority; 69% indicated that increasing the number of "hands-on" technology classrooms should be a moderate-to-high budget priority; and 62% indicated that expanded technology classroom tools (e.g., video course capture, interactive whiteboards, annotation tablets) should be a moderate-to-high budget priority (Table 1).

Table 1: Faculty "Teaching with Technology" Survey Ranking of Budget Priorities*	% High Priority	% Moderate Priority	% Low Priority
More technology classrooms	56	26	5
More "hands-on" technology classrooms	42	27	6
Expanded tools (e.g., video course capture, interactive white boards, annotation, etc.)	34	28	12
Course Management Systems (UBlearns upgrades)	33	33	8
Library facilities/services	32	36	3
Facilities for technology tool use (e.g. scanners, A/V and multimedia editing)	27	31	10
Digital content storage/repository	25	29	10
Seminars to improve pedagogy through use of instructional technologies	25	29	17
Emerging technologies (blogs, wikis, podcasting)	23	28	13
Improve discipline-specific software	23	28	11
Small, technology-rich work group spaces	23	26	10
Ability to borrow technology tools (laptops, projectors, cameras, recorders)	20	29	11
Improving student IT literacy skills	19	35	8
More public computing labs / spaces	19	31	11
Facilities for students to learn how to use technology tools (e.g., scanners, A/V editing and multi-media incorporation)	15	32	14

Note: category rows will not equal 100% - "no opinion" and "neutral" responses omitted

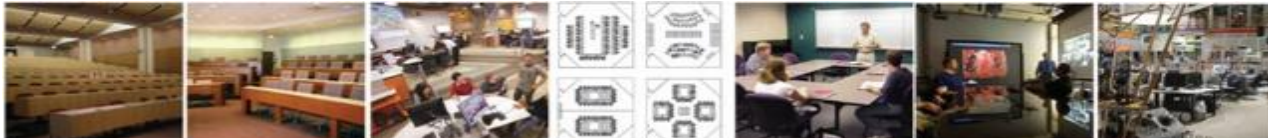**UNIVERSITY AT BUFFALO LEARNING SPACE FACULTY SURVEY (2008)**

Three key findings from the joint DEGW-TLT Task Group UB Learning Space Faculty Survey (summarized in the *DEGW Report: 2008 UB Learning Space Faculty Survey*) were consistent with other TLT-TG faculty data sets:

Need for Flexible Learning Space

- Faculty reported a significant need for adaptable learning spaces throughout campus – including flexible classrooms with modular seating, case study rooms, learning studios, etc.

Ideal Percentage of Class Time Spent in Learning Spaces – Summary

Lecture Hall	Case Study Room	Learning Studio	Flexible Classroom	Seminar Room	Meeting Room	Technology Sandbox
27%	18%	8%	20%	21%	3%	3%

Need for Flexible Scheduling of Learning Spaces

- Many faculty members would prefer to design and deliver courses that use multiple learning spaces – with more than 40% of faculty respondents indicating that they would prefer to teach their courses in two or more learning spaces

Optimal Number of Learning Spaces Reported for Each Course - Summary

One Learning Space	Two Learning Spaces	Three or More Learning Spaces
58%	31%	10%

Obstacles to Teaching

- The single greatest obstacle to teaching at UB is the lack of appropriate learning spaces – with the environmental quality, inappropriate furniture, design quality, and inappropriate technology also registering significant marks

Obstacles to Teaching at UB – Summary

Unavailability of Appropriate Learning Spaces	Environmental Quality of Learning Spaces	Inappropriate Furniture in Learning Spaces	Large Class Sizes	Design Quality of Learning Spaces	Inappropriate Technology in Learning Spaces	Lack of Time for Trying New Teaching Approaches
48%	48%	43%	41%	37%	32%	30%

"BLUE SKY" GROUP – DATA ANALYSIS

Early "Blue Sky" sub-group discussions took place on wiki to collaborate and focus attention on the importance of incorporating Web 2.0 applications into classroom instruction – and on the need for more technology-rich classrooms and flexible learning spaces. Among the more specific recommendations:

- Technology classrooms and flexible learning spaces must be self-scheduled and available for formal and informal learning
- Technology classrooms and flexible learning spaces must be available to students and faculty outside the normal centrally-scheduled system that currently exists
- Knowledge created in virtual and concrete learning spaces must be captured and stored in a manner that allows it to serve as a scaffold for the development of future knowledge
- Adequate digital storage and transmission methods must be in place to allow external collaborators access to classroom and research content
- Faculty development to support new learning paradigms is critical to success
- Professional development must be available in a variety of ways to encourage the use and growth of collaborative facilities and processes
- Development grants should be made available to increase awareness and incentive to incorporate new teaching methodologies into curriculum and course redesign
- Access to new facilities must be driven in a fashion that matches pedagogy to need. In other words, the current model of "seat count" or faculty seniority should never "trump" access to facilities where requests are driven by innovation and pedagogical necessity
- A peer advisory panel could vet short proposals in order to grant access to specialized learning spaces to interested faculty
- Discipline-specific software should be available in advanced facilities whenever possible to supplement instruction with tools otherwise unavailable to the discipline

Some of these "Blue Sky" recommendations were subsequently shared with, and incorporated into, the Collaborative and Learning Spaces Report (2008).

"MATRIX" GROUP – DATA ANALYSIS

In fall 2008, following the development of the pedagogical "matrix" of desirable learning space attributes, the TLT-TG "Matrix" group designed a new study to collect data in central and departmental learning spaces to benchmark against these attributes. Using an instrument designed in collaboration with Capital Facilities and Space Planning, the audit assessed a broad range of classroom features, including:

- Classroom seating (fixed, flexible)
- Classroom lighting (zoned, flexible)
- Display tools (chalkboard, whiteboard)
- Audio/Visual tools (microphones, speakers, data projectors, overhead projectors)
- Computer tools (student computing stations, technology-enhanced lecterns, annotation)
- Wireless network availability/quality
- Live conferencing/course capture tools

The group referred to the newly developed matrix (Table 2) that sorted attributes into elements of room design, enterprise infrastructure and media content tools. These were then sorted into standards: low

(undesirable), medium (baseline) and high (ideal). Cognizant of budget constraints, the subcommittee then set about the task of determining how "ideal" learning spaces could be strategically distributed across campus, which dovetailed into the DEGW Master Planning efforts, and supported development of the TLT-DEGW Faculty "Learning Landscape" survey.

Table 2: Vision for a New Pedagogical Matrix**

	Technology & Tool Type	Low (undesirable)	Medium (baseline)	High (ideal)
Room Design	Flexible Lighting	On/off or full room dimming	Dimming plus filtering/shading/blocking	Zoned lighting with flexible spot control for video capture
	Furniture/Room Configuration	Fixed seating and room configuration	Adjustable seating, but fixed room configuration	Fully configurable seats, tables and dividers
	Teaching Station	None	Fixed and configurable	Moveable and configurable
	Sound (Vocal Reinforcement)	No resident infrastructure, by special request only.	Single presenter, wireless microphone delivered by reservation/request	Multi-presenter, multi-participant microphone/capture access (fixed system, resident access)
	Room Acoustics	No special treatment, dampening, or HVAC isolation	Special treatment, some dampening & HVAC isolation or balancing	Acoustically treated and balanced, no refraction & highly isolated from external sound
	Chalk/White Boards (traditional)	Single fixed	Multiple boards (on slides)	Multiple movable boards
	Student Computing Stations	Seating only	Wireless access, powered workspace	Fixed (or wireless) computer stations that interact with display & faculty station
Infrastructure	Live Conferencing	Audio only, or audio+desktop presentation; site to site; no archiving	Desktop sharing; site to site; archiving	Full motion, interactive video with data sharing; multi-site; archiving and annotation
	Cell Phone Reception	No availability	Available, but not configurable	Available and configurable (limit access)
	Network Access	Single wire port, Internet only	Wired ports with Internet & LAN access, marginal wireless neighborhood	Dedicated wireless access or fully wired classroom with Internet and LAN access
	Printing	None	Printer restricted to specific lab or learning space	Distributed to "on demand" pick-up
	Data Access	BYO drive or disk	Access to enterprise-level UB resources	Highly personalized institutional repository at enterprise & departmental access level
Media Content Tools	Media Playback (DVD, VHS)	Personal player device and/or laptop	Resident DVD/VHS player	Access network video
	VOD (Video on Demand)	Access to content server via laptop	Access to pre-recorded content (e.g., course reserve or media library) through computer or appliance	Access to live or time-shifted content (e.g.,self-scheduled or DVR-style) through computer or appliance
	Annotation	Built-in annotation via PPT o similar SW on laptop	Faculty annotations captured/shared via external, resident device (e.g., sympodium)	Collaborative faculty/student annotation. Captured/shared in real time.
	Smart Boards (electronic)	White board capture, no collaboration	Single image, single board capture and collaboration	Multi-image, multi-board capture and collaboration
	Course/Content Capture	Voice and/or desktop capture	Enhanced podcast (frame grabbing with voice)	Full course capture (full motion video, content & voice)
	CRS ("Clickers")	Portable system on request	Fixed system with physical clicker in central classrooms	Clickers/polling available on- and off-campus real time via clicker device/laptop/mobile
	Video Projector	Single image, fixed	Multi-image fixed	HD multi-image, multi-wall
	Sound	Single speaker, mono	Dual speaker, stereo	Zoned and/or surround sound
	Instructor Computer	Laptop plug-in only (projection-ready)	Single platform computer, standard SW image	Multi-platform, multi-boot, personal settings - Active Directory.

*** See appendix, page 19, for full-sized version of Table 2*

Teams of volunteers subsequently conducted site visits to over 400 unique classrooms, classified in three categories: 1) centrally supported, 2) departmentally supported, or 3) departmentally scheduled/centrally supported through some combination of hardware and/or staffing service level partnership agreement[2]:

Space Classification	N=Spaces Surveyed	% Containing Technology
Departmental	264	18%
Central	132	75%
Partnership/support agreement	8	100%

Two pedagogical audit questions addressed classroom modularity/flexibility:

- 80% of central classrooms have "zoned lighting" (dimmers; multiple switches or spot control for course capture) – compared with 43% of departmental classrooms.

Room Lighting Flexibility	Central	Departmental
Limited to on/off	18% (n=24)	56% (n=142)
Zoned lighting (w/ or w/out spot)	80% (n=106)	43% (n=110)

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[2] *Categories "other" and "centrally supported, departmentally scheduled" (n=8) are not included in these tables. Variation in reporting or inconsistencies may be due to non-report of individual variables (inter-rater reliability).*

- The level of furniture flexibility and mobility is likely influenced by the space classification. Large lecture halls are more likely to be centrally supported, with flexible seating combined with fixed tables most likely reflecting departmental teaching (or "wet") labs. Both central and departmental classrooms are heavily populated with arm-tablet chairs.

Furniture Configurability	Central	Departmental
Fixed (large lecture halls)	16% (n=18)	7% (n=18)
Mobile seats, fixed tables (e.g. labs)	7% (n=9)	50% (n=126)
Configurable chairs/tables	68% (n=86)	39% (n=99)

Six survey questions addressed classroom technology and A/V topics that fall into the pedagogical "minimal technology standard" definition.

Audio-Video Features	Central	Departmental
Multiple or distributed speakers	72% (n=94)	24% (n=62)
DVD and/or VHS playback	95% (n=123)	30% (n=75)
Video projector or monitor	80% (n=105)	48% (n=118)
Technology enhanced podium	73% (n=96)	18% (n=46)
Visualizer™ or Elmo™	44% (n=58)	15% (n=38)
"Clicker" or other PRS software	44% (n=72)	2% (n=6)

Much of the technology is supported through, and dependent upon, network quality/bandwidth, and it is encouraging that both centrally and departmentally supported space reflects nearly 2/3rds of all classrooms having "strong" wireless signals. (Data collectors checked signal quality at several locations within each classroom.) The remaining one-third reported adequate-to-weak signal strength, though reliability varied depending on the room location. Similar observations were made with cell phone reception, but it was later determined that too many technical variables existed to report reliable data.

While some of these figures are promising – and show that UB has made considerable advances in equipping its classrooms for technology-enhanced teaching and learning (particularly in centrally supported classrooms), it is important to point out the areas in which UB classrooms fall short of the minimum technology/pedagogy needs expressed by the faculty – particularly in the emerging technologies area of course/video capture and online collaboration:

- In aggregate, across all campus classrooms, data collectors noted evidence of some type of digital lecture recording ("distance learning friendly" plates, desktop content capture software or cameras mounted in classrooms) in only 12% of classrooms (n=30). This excludes the centrally scheduled "Lec-Rec" digital lecture recording system (which is audio-only, and does not offer content or video capture).

Emerging Technologies	Central	Departmental
Lecture recording technology*	21% (n=27)	12% (n=33)
Annotation device	<1% (n=1)	3% (n=12)
Electronic/collaborative boards	<1% (n=1)	7% (n=17)

Data collectors may not have observed microphones present, but most centrally supported large lecture spaces are wired for automated "Lec-Rec" lecture recording.

Emerging technologies appear to be more prevalent in <u>departmentally</u> supported classrooms. For example, the Medical School has been an early adopter of annotated displays. Faculty anecdotally reports these tools assist with student engagement and information retention.

PARTNERSHIP AGREEMENTS: PAST AND FUTURE?

An ad-hoc staff review indicates that approximately 20 spaces are engaged in some type of partnership agreement where central funds support departmental space with a defined level of staffing and/or hardware support (340-C Bell Hall, 200-G Baldy Hall, B-15 Abbott, 710 Kimball, 1110 Kimball, Butler Auditorium, Farber 144, Farber G-26, COE B1-30, B2-305, B3-301, B4-301, Capen 505, 531, 567, Clemens 120, Capen 31, Capen 23F, Jacobs 106, Park 247). Not all of these spaces were surveyed, but this evidence may be encouraging to faculty and administrators who seek new methods of deploying technology across campus.

Faculty and students clearly do not differentiate between space classifications when they are responsible for (or receive) instruction. They are unaware of the funding mechanisms that impact technology standards or deployment, and regrettably there has been concern expressed by departmental representatives (during this exercise) that departmental scheduling autonomy will be lost should space become supported at a central level.

From an adoption of innovation perspective, technology renovation and construction has historically been less complex to manage in centrally scheduled spaces. Typically, central spaces are identified for upgrades, with classes or events being moved to other centrally scheduled space in order to accommodate construction schedules. Given the level of coordination complexity, it has made sense to deploy technology in central spaces first, followed by investigation of new ways to move technology into spaces at departmental levels.

The TLT Task Group carried out a clear objective to assess classroom learning spaces without regard for classification as "departmental" or "centrally" scheduled entities, allowing the data to speak for itself should patterns emerge.

CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

The TLT Task Group review of new and existing data sets generated the following conclusions and recommendations:

- **UB needs to explore ways to ensure that classroom facilities meet the pedagogical and technological needs of faculty.** UB faculty members expressed a desire for three types of flexibility:
    - Flexibility in the allocation of classroom space – and the need for classroom allocation decisions to be driven by pedagogy and instructional need (rather than by location, seniority, convenience, etc.)
    - Flexibility in the number of learning spaces allocated to each course – and the need on the part of some faculty for multiple learning spaces
    - Flexibility in the configuration of learning spaces – and the need for more classroom spaces that support multiple approaches to teaching, learning, and collaborative work.

- **UB needs to ensure that all classroom facilities meet a minimum pedagogical technology standard in addition to a facilities standard.** While UB has made considerable progress in this area, too many learning spaces are insufficiently equipped to support faculty technology use. The TLT-TG recommends that faculty representatives, CIT, Facilities, Capital Facilities and Space Planning, and the TLC collaborate to develop a "minimum technology standard" for all UB classrooms – and that budget allocations for technology reflect the need to ensure that all classrooms are sufficiently equipped to support faculty technology use.

- **UB needs to continue to invest in – and support faculty experimentation with – emerging technologies.** UB faculty members continue to incorporate innovative technologies into the teaching-learning process – especially Web 2.0 tools that foster new forms of collaboration, information-sharing, and knowledge-creation. As faculty members continue to explore how these tools can support and enhance instruction, UB will need to ensure that resources are allocated in a manner that allows faculty to stay ahead of the technology "curve."

- **UB needs to continue to invest in and support faculty professional development**. Significant discussion was noted in several reports (Learning Landscape, CaLS and TLT Blue Sky) that professional development resources must be coupled with technology investment in order for the investments to be effectively translated into the knowledge creation envisioned by faculty and instructional support staff.

- **UB must continue this positive trend of faculty consultation when designing learning spaces and supportive infrastructure**. The integration of TLT Task Group with other efforts on campus received endorsement from multiple faculty and space planning committees. Virtually all surveys and focus groups reviewed as part of this work reinforced the need to receive faculty input (and review) regarding pedagogical planning and functions on campus.

Limitations

The work of this task group was a combination reviewing existing data, creating new studies to answer research questions and finally, an examination of selected, existing spaces across campus. Limitations to this work include the following:

- **Not all campus spaces were examined.** It was not possible for the data collection volunteers to examine all of the campus spaces in the time available.
- **Accuracy of reported data may vary.** Although a rigorous preparation process was adhered to (two distinct phases of pilot testing, including full team meetings to review data collection on site), a staff review of the raw data indicates that some spaces may not have been completely reported, or perhaps inaccurately reported. This would be explained by:
  - Late additions of student team members;
  - Encountering technology that collectors may not have been previously exposed to;
  - Technology may be available to instructors upon request, but was not observable on site during the data collection visit.

Considered in the aggregate, the TLT-TG remains confident that these minor reporting inaccuracies would have no meaningful impact on the overall trends observed.

TEACHING, LEARNING AND TECHNOLOGY TASK GROUP MEMBERSHIP

- Barbara Rittner, TLT Task Group Co-Chair
    Professor and Associate Dean, School of Social Work
- Lisa Stephens, TLT Task Group Co-Chair
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- Kathleen Byrnes, *Teaching & Learning Center*
- Kevin Lim, *Teaching & Learning Center*
- Lynne Banks, *Instructional Technology Support Services*
- Mili Pradhan, *Teaching & Learning Center*

DATA REFERENCES AND RESOURCE LINKS

Please refer to http://ubit.buffalo.edu/scoreboard/surveys/ for links to the following reports:

- Faculty 2007 "Teaching with Technology" Report and Raw Frequencies
- Student IT Survey Data and Reports (2004-2008)

The University at Buffalo CALS Report (2008) is available on request through the TLT co-chairs.

ITSS Classroom Technology Surveys (2006-2008) are available on request through John Pfeffer, Service Area Leader of Instructional Technology Support Services or the TLT co-chairs.

The searchable ITSS Classroom Services Attributes Matrix (or PDF) is available at: http://itsweb.cit.buffalo.edu/searchindex.cfm

EDUCAUSE ECAR Reports of Undergraduate Students and IT (2004-2008) is available at: http://connect.educause.edu/Library/ECAR/TheECARStudyofUndergradua/45075

Peer Institution Faculty and Student Survey Reports are available as follows:
University of Minnesota – courtesy of the Digital Media Center - http://dmc.umn.edu/
University of Wisconsin – Madison Faculty Survey - http://minds.wisconsin.edu/handle/1793/6658

TLT TASK GROUP MEETINGS, DELIVERABLES AND PROCESS SUMMARY

Date	Action	Deliverable(s)
9.24.07	Initial meeting – Lesniak, Rittner & Stephens discuss scope, outcomes, etc. Will identify & invite potential stakeholders from past surveys, and survey faculty hired over past 3 years to see what teaching technologies & services they've used prior to UB	-Review faculty "Teaching with Technology" Survey design -Identify potential participants -Design "New Faculty" survey -Get new hires list from Provost's office
10.17 - 11.15.07	Launch new faculty survey, continue internal/ external data review, analyze results, use as foundation at initial kick-off meeting to illustrate how UB compares with peers. Begin compilation of data into presentation for "TLT Kick Off"	-Use data to frame needs assessment -Invite self-identified new faculty to participate in task group. -Issue broad stakeholder invitations based on aggregate survey data and review of support staff in all decanal areas.
1.9.08	Stephens, Rittner, Lesniak review presentation, clarify "asks" and how to move forward.	-PPT presentation and supporting documentation.
1.11.08	TLT Advisory Group "Kick Off" meeting convened with participants identified from surveys, references and general interest.	Created 3 sub-groups to address pedagogy & support facilities, and UB*learns* Site.
1.30.08	Matrix Sub-Group meets to review services matrix	Decision to align work with other efforts on campus, adopt common language.
2.4.08	Stephens, Rittner & Sturman meet to plan for sub-group discussions.	Guiding questions to lead discussion.
2.11.08	Blue Sky Sub-Group meets to discuss pedagogical needs, and what is necessary to be effective in new learning environments.	-Wiki set up (Yearke) -Detailed teaching examples necessary to articulate and clarify need – participants load in Wiki. -Copy UBlearns docs into wiki site
2.13.08	Faculty "Teaching with Technology" presented to distributed (node) IT leadership.	-Directors encouraged to direct interested faculty to TLT –TG, or contact group members with follow-up questions.
3.5.08	Blue Sky meets to review progress and idea generation from wiki.	Deliverables shared and integrated into the CaLS group report.
3.12.08	Matrix group discusses data review and how to incorporate Blue Sky ideas, and TLT role in Master Planning.	- Create new pedagogical matrix. -Student IT Learning with Technology survey being drafted – forward ideas.

3.21.08	Meeting with DEGW to review HOTC plan and data.	TLT documents shared with DEGW, agreement to work more collaboratively with HOTC efforts.
3.26.08	Matrix group meets to review	New matrix largely complete, will integrate existing facilities data, group agreed to work through the summer and create a web form to collect new data. Meet 4.16 for review of web form draft.
4.4.08	Stephens, Pfeffer meet to review DEGW report prior to narrow focus for TLT-TG meeting, seeking additional comment	-List of items for TLT and sponsor consideration.
4.7.08	-Review of DEGW preliminary report -Carl Lund TLC presentation of new tool use.	Corrected some issues & report language from TLT perspective, incorporate some notes from Lund presentation into CaLS report.
4.14.08	Sturman, Stephens, Lesniak & Rittner meet to strategize closure on "Blue Sky" efforts, design faculty survey for learning spaces with DEGW. Clarify advisory role of TLT.	Determine "bridge building" group can't be convened until more campus-wide work is complete. Began collaborative survey outline with Antonina Simeti from DEGW.
4.16.08	Matrix group meets to refine tool, discuss budget impact, DEGW, review facilities data, align with DEGW nomenclature on web tool.	Slomka, Gaeddert & Allen to reconcile facilities excel file with web tool, next meet with ITSS (4.23) for review, re-work FSEC slides for IFSC meeting. Begin thinking about how to report findings.
4.23.08	Presentation of TLT Work to Faculty Senate Executive Committee	Received endorsement to continue work and serve as the recognized FSEC advisory group
4.23.08	Matrix group and DEGW re: progress and next steps. Review U Minn. model, pedagogical audit, need to address simulation opportunities; Assess dept. needs to "cluster" solutions; challenge of non-standard scheduling among colleges/prof. school calendars.	Continue work on Vovici instrument for faculty survey. Translate discussion points into probes.
4.30.08	Sturman, Rittner, Stephens & Simeti (DEGW) begin collaboration on new faculty survey that highlights learning landscape principles	Survey results coupled with online "audit" should help define need. May need to survey faculty again in the fall to get higher return.
5.5.08	DEGW-TLT Faculty "learning landscape" survey launched to identify future space and classroom technology needs. Included probes for preferred class size, scheduling and logistical details.	-Data to inform DEGW Learning Landscape report and TLT Task Group report. -Set up and plan for Stakeholder Progress Report.

5.6.08	TLT Campus Stakeholder progress meeting for all participants who attended the "kick off" meeting to report sub-group progress (Blue Sky and Matrix). Describe "next steps" to assess all campus classrooms as gap analysis for new "Matrix."	PPT report and distribution of new "Matrix" vision for pedagogically driven classroom technology standards.
5.12.08	FPMO presentation (departmental space planners) to seek endorsement of audit.	Dick Noll will follow up to schedule visits.
5.21.08	Audit tool refinement meeting. Tsembelis, Pfeffer, Sullivan and Stephens piloted tool with ITSS student, discovered new needs.	Summary of edits emailed to Slomka to modify database collection tool.
6.2.08	Instructional Facilities Work Group meeting.	Report of TLT findings to date – expressed faculty needs & matrix.
6.26.08	Matrix sub-group meeting with Slomka & Stephens to review and implement 5.21 notes progress.	Created new "to do" list of edits for tool, Conference call replaced real time meeting on 7.24.08, agreed to review revisions with full team on 8.19.08
8.18.08	Instructional Facilities subcommittee meeting – Planning Review of proposed '09 projects.	New TLC Director Adsit scheduled to join team as soon as practical.
8.19.08	Ron Place from Facilities joined the meeting to describe possible resources for online tool audit	Slomka to further refine data collection tool & alert team when complete.
8.26.08	http://sandbox3.lib.buffalo.edu/dlc/ubtltmatrix/scripts/ reviewed & further refined. Space Planning (Barnas, Place, Noll) provided insight for data collection planning	Refer to detailed list for edits. Stephens to provide Noll a comprehensive list of data collection volunteers during Jewish holidays.
8.27.08	Instructional Facilities Meeting, budget planning for 09 projects and review prior to presidential budget priorities meeting	Stephens to provide written brief to Greenfield re: CaLS rationale and pedagogical rational for budget review.
8.28.08	Stephens, Noll, Sturman, Slomka – work session for data collection. Agreed on deliverables schedule & coordination details with ITSS & SA's.	Stephens to distribute notes, Slomka to circulate final tool for testing. Refer to WBS for specifics.
9.2.08	Work session for Rosh Hashanah, Yom Kippur data collection, transfer data collection instrument from pilot to production server	Slomka to alert when production server ready for testing.
9.4.08	Instrument review and WBS work session follow up with full group	Stephens to edit URL language directly in tool.

9.10.08	Review WBS with Sponsor (Lesniak), develop "plan B" for data collection tool.	Hard "go-no go" deadline 9.12 set for data collection production tool.
9.11.08	Creation of "Plan B" Vovici data collection tool and process shift. Stephens circulates Vovici instrument draft, works with Sullivan for refinement of training "run through" instrument draft (for 9.12 training session)	Finalize Vovici draft for training session orientation.
9.12.08	Training Session for Noll, Byrnes, Adsit, Stephens, Sullivan, Lim, Banks, Sturman.	Identify edits for Vovici tool. Agree to 9/19 walk-through data test
9.19.08	Data collection walk through with cameras and laptops.	Stephens to finalize & distribute procedures for 9/30 data collection. Noll to finalize appointments with departmental FPMO's.
9.30.08	Technology Classroom pedagogical audit (day 1) data collection north & south campus.	Review frequencies, Stephens, Sullivan and Noll to prepare for day 2 (10/9).
10.9.08	Technology Classroom pedagogical audit (day 2) data collection north & south campus.	361 records, Banks & Noll will complete the additional rooms.
10.16.08	Final Report Planning Meeting: Place, Greenfield, Bailey, Stephens, Adsit, Rittner, Sullivan develop strategy for final report.	Adsit and Stephens to take lead writing report, distribute to TLT for comment, create PPT for stakeholder presentations, and release through IFS.

TLT Task Group Recommended Pedagogical Matrix

	Technology & Tool Type	Low (undesirable)	Medium (baseline)	High (ideal)
Room Design	Flexible Lighting	On/off or full room dimming	Dimming plus filtering/shading/blocking	Zoned lighting with flexible spot control for video capture
	Furniture/Room Configuration	Fixed seating and room configuration	Adjustable seating, but fixed room configuration	Fully configurable seats, tables and dividers
	Teaching Station	None	Fixed and configurable	Moveable and configurable
	Sound (Vocal Reinforcement)	No resident infrastructure, by special request only.	Single presenter, wireless microphone delivered by reservation/request	Multi-presenter, multi-participant microphone/capture access (fixed system, resident access)
	Room Acoustics	No special treatment, dampening, or HVAC isolation	Special treatment, some dampening & HVAC isolation or balancing	Acoustically treated and balanced, no refraction & highly isolated from external sound
	Chalk/White Boards (traditional)	Single fixed	Multiple boards (on slides)	Multiple movable boards
	Student Computing Stations	Seating only	Wireless access, powered workspace	Fixed (or wireless) computer stations that interact with display & faculty station
Infrastructure	Live Conferencing	Audio only, or audio+desktop presentation; site to site; no archiving	Desktop sharing; site to site; archiving	Full motion, interactive video with data sharing; multi-site; archiving and annotation
	Cell Phone Reception	No availability	Available, but not configurable	Available and configurable (limit access)
	Network Access	Single wire port, Internet only	Wired ports with Internet & LAN access, marginal wireless neighborhood	Dedicated wireless access or fully wired classroom with Internet and LAN access
	Printing	None	Printer restricted to specific lab or learning space	Distributed to "on demand" pick-up
	Data Access	BYO drive or disk	Access to enterprise-level UB resources	Highly personalized institutional repository at enterprise & departmental access level
Media Content Tools	Media Playback (DVD, VHS)	Personal player device and/or laptop	Resident DVD/VHS player	Access network video
	VOD (Video on Demand)	Access to content server via laptop	Access to pre-recorded content (e.g., course reserve or media library) through computer or appliance	Access to live or time-shifted content (e.g.,self-scheduled or DVR-style) through computer or appliance
	Annotation	Built-in annotation via PPT o similar SW on laptop	Faculty annotations captured/shared via external, resident device (e.g., sympodium)	Collaborative faculty/student annotation. Captured/shared in real time.
	Smart Boards (electronic)	White board capture, no collaboration	Single image, single board capture and collaboration	Multi-image, multi-board capture and collaboration
	Course/Content Capture	Voice and/or desktop capture	Enhanced podcast (frame grabbing with voice)	Full course capture (full motion video, content & voice)
	CRS ("Clickers")	Portable system on request	Fixed system with physical clicker in central classrooms	Clickers/polling available on- and off-campus real time via clicker device/laptop/mobile
	Video Projector	Single image, fixed	Multi-image fixed	HD multi-image, multi-wall
	Sound	Single speaker, mono	Dual speaker, stereo	Zoned and/or surround sound
	Instructor Computer	Laptop plug-in only (projection-ready)	Single platform computer, standard SW image	Multi-platform, multi-boot, personal settings - Active Directory.