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Delivering High Stakes Assessments in a Computerized Testing Center

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History of the CTC

- Construction completed July 2005
- Pilot testing with live exams began August 2005 with 9 faculty participating
- Testing open to users beyond pilot group August 2006 – currently 50+ faculty participating

History of the CTC

- Since then, we have administered approximately 30,000 exams in the CTC using LXR
- CTC is also used for training of an additional 5,000 people per year.

The Facility

- Seating for 120 in main rooms
- Seating for an additional 15 in satellite room.
- Seating for 6 in individual ADA rooms.
- Security cameras.


100


DELL
DYKES LIBRARY

LXR

- Currently on version 6.1.4.0
- Can deliver exams via web or LAN.
- Very powerful reporting features
- Extensive statistics and metadata attached to items in item banks
- Relatively steep learning curve
- Requires faculty to submit exams in advance for publishing to server. No ability to create last minute exams.

LXR

- Uses a desktop client to create, maintain and administer exams.
- This software must be licensed, installed and supported on users' desktops. We currently support and installed base of approximately 50 users.
- Has been very stable and reliable, but user interface is beginning to show its age.

LXRTEST V6.1 - [SAMPLE QUESTIONS.LXRBANK]

File Edit Insert View Question Select Window Utilities Help

Projects
Questions
Tests
Specs
Scores
Grading
Students
Headers
Online

Navigation: FLAGS 1

Selection: All 77 / Selected 0 / Select this one

Layout: Type: Matching | Left: 5 | Right: 10 | 123 Col: 1

Time		Each	Total		1	2	3	4	5
1	Points	1.00	5.00	Answer	B	I	D	G	C

Ref/Task	Difficulty	Topic	Subtopic	Grade/Pos	Cognit Lev	Type	Status
CHAPTER 05	MEDIUM	FLAGS	STATES	4	RECALL	POSITIVE	ACTIVE

Arial 10

Match the flag on the left by choosing the correct letter of your choice on the right:




A. North Carolina
B. South Carolina
C. Georgia
D. Kansas
E. Missouri
F. Tennessee
G. California
H. New York
I. Ohio
J. Rhode Island

Response form

LXRTEST V6.1 - [SAMPLE TEST.LXRTEST]

File Edit View Select Window Utilities Help

Projects
Questions
Tests
Specs
Scores
Grading
Students
Headers
Online

Question Bank(s):
C:\Program Files\LXR\LXRTEST v6\Samples\S

Question View:
Item
All
Selected

Test Information:
Test Date: 3/30/1999
Test Name: Sample Test
Header 1:
Header 2:
Items: 50 Points: 57.00
Time: 45 Diff: 0.80 rpb: 0.33

LXR*TEST	11	T/F
LXR*TEST	12	T/F
LXR*TEST	13	T/F
LXR*TEST	14	T/F
LXR*TEST	15	SHO
LXR*TEST	16	SHO
LXR*TEST	17	MCS
LXR*TEST	18	LET
LXR*TEST	19	MAT
LXR*TEST	20	MAT
REAL ESTATE	1	MCS
REAL ESTATE	2	MCS
REAL ESTATE	3	MCS
REAL ESTATE	4	MCS
REAL ESTATE	5	MCS
REAL ESTATE	6	MCS
REAL ESTATE	7	MCS
REAL ESTATE	8	MCS
REAL ESTATE	9	MCS
REAL ESTATE	10	MCS
REFERENCE	1	INS
REFERENCE	2	INS
REFERENCE	3	INS
REFERENCE	4	INS
REFERENCE	5	INS
RESPIRATORY CARE	1	MCS
RESPIRATORY CARE	2	MCS
RESPIRATORY CARE	3	MCS
RESPIRATORY CARE	4	MCS
RESPIRATORY CARE	5	MCS
RESPIRATORY CARE	6	MCS
RESPIRATORY CARE	7	MCS
RESPIRATORY CARE	8	MCS
RESPIRATORY CARE	9	MCS
RESPIRATORY CARE	10	MCS

Pick
Move >>
<< Move
Forms: 0

1:	1	FLAGS	1 MAT
1:	6	FLAGS	2 MAT
1:	11	LANGUAGE ARTS	1 MCS
1:	12	LANGUAGE ARTS	2 MCS
1:	13	LANGUAGE ARTS	3 MCS
1:	14	LANGUAGE ARTS	4 MCS
1:	15	LANGUAGE ARTS	5 MCS
		REFERENCE	5 INS
1:	*16*	*LANGUAGE ARTS*	*6 T/F*
1:	*17*	*LANGUAGE ARTS*	*7 T/F*
1:	*18*	*LANGUAGE ARTS*	*8 T/F*
1:	*19*	*LANGUAGE ARTS*	*9 T/F*
1:	*20*	*LANGUAGE ARTS*	*10 T/F*
		REFERENCE	2 INS
1:	21	LXR*TEST	1 MCS
1:	22	LXR*TEST	2 MCS
1:	23	LXR*TEST	3 MCS
1:	24	LXR*TEST	4 MCS
1:	25	LXR*TEST	5 MCS
1:	26	LXR*TEST	6 MCS
1:	27	LXR*TEST	7 MCS
1:	28	LXR*TEST	8 MCS
1:	29	LXR*TEST	9 MCM
1:	30	LXR*TEST	10 MCS
1:	31	MATH	1 MCS
1:	32	MATH	2 MCS
		REFERENCE	1 INS
1:	*33*	*MATH*	*3 MCS*
1:	*34*	*MATH*	*4 MCS*
1:	35	MATH	5 MCS
1:	36	MATH	6 T/F
1:	37	MATH	7 MCS
1:	38	MATH	8 T/F
1:	39	MATH	9 MCS
1:	40	MATH	10 T/F
		REFERENCE	3 INS
1:	*41*	*PHYSICS*	*1 MCS*
1:	*42*	*PHYSICS*	*2 MCS*
		REFERENCE	4 INS
1:	*43*	*PHYSICS*	*3 MCS*
1:	*44*	*PHYSICS*	*4 MCS*
1:	45	PHYSICS	5 MCS
1:	46	PHYSICS	6 MCS
1:	47	PHYSICS	7 MCS
1:	48	PHYSICS	8 MCS

Benefits of Electronic Testing

- Item banks
- Statistics
- Meta data
- Immediate feedback
- Mirrors national certification testing

Challenges & Lessons Learned

- Acceptance
- Security
- Reliability
- Scalability
- Scheduling
- Support


ACCEPTANCE

Acceptance

CHALLENGE:

- High-stakes electronic testing is new to many faculty and students, yet a CTC must have their support and trust if it is to be successful.
- Faculty may already have a substantial investment (item banks and training) in existing systems.

Acceptance

LESSONS LEARNED:

- Conduct extensive pilot testing. Don't be afraid to try different solutions to problems.
- Include school administration, faculty and students in the planning, design and development of the CTC and its systems, policies and procedures.

Acceptance

LESSONS LEARNED:

- Form an Advisory Group and meet often to facilitate communication.
- Conduct student orientation sessions whenever possible. Don’t have the students first experience with the CTC be for a high-stakes exam!

Acceptance

LESSONS LEARNED:

Plan in advance how you will facilitate importing existing items from legacy systems into your new electronic testing software.


SECURITY

Security

CHALLENGE:

- Fairly or unfairly, electronic testing is often held to a higher standard than traditional testing.
- Electronic item banks are often created and used over several years. If a single bank becomes compromised, several years of work could be lost.

Security

CHALLENGE:

If you cannot seat an entire class at once, you may need to test in more than one wave thus introducing the possibility of students sharing information about an exam.

Security

CHALLENGE:

Web-based exams must be locked down to prevent undesired access from outside. Conversely, students must be prevented from accessing outside web sites during an exam.

Security

LESSONS LEARNED:

Conspicuously record testing sessions on video. Communicate to students that this is being done in part to protect them from unwarranted accusations of cheating.

Security

LESSONS LEARNED:

Create a systematic and consistent check-in process. We require students to show photo ID upon check-in. Their admission tickets also serve as their scrap paper. This is turned in as students leave. No paper leaves the CTC and no outside paper is allowed in.

Security

LESSONS LEARNED:

All book bags and personal belongings must be stored in lockers or at the side or front of CTC. Electronic devices including cell phones must be turned off and put away for duration of exam.

Security

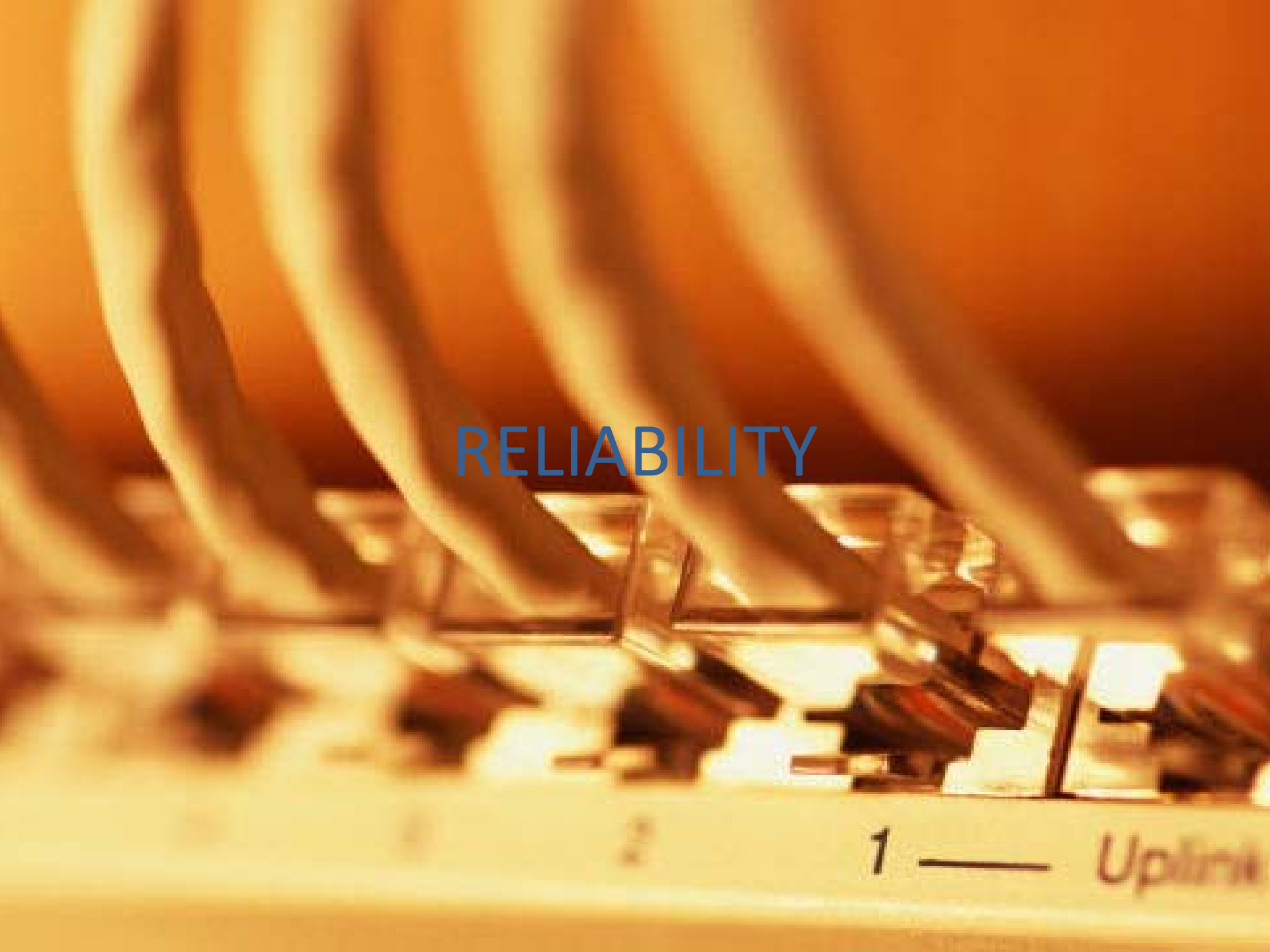
LESSONS LEARNED:

- Let faculty and schools make the call in cases of suspected cheating. We only provide evidence to assist in this process.
- We use secure browsing software (SiteKiosk) to prevent students from accessing other web sites or applications during exams.

Security

LESSONS LEARNED:

We tightly restrict access to our LXR web server via IP address. Exams are password protected and all access is logged by time and IP. Users must be present in the LXR student database for that course before they can log in to an exam.


RELIABILITY

Reliability

CHALLENGE:

There are many opportunities for serious disruptions during electronic testing sessions. Each of several critical elements of the system must work for the exam to be successful.

Reliability

CHALLENGE:

Critical elements of the system include:

- Power
- Network connectivity
- Web Server
- Database Server
- Workstations

Reliability

CHALLENGE:

- These critical systems must work 100% of the time or you will encounter disruptions.
- Data loss or data corruption can be disastrous.

Reliability

CHALLENGE:

Every software update, patch, hardware replacement, etc. impacts the reliability of the system as a whole.

Reliability

LESSONS LEARNED:

- Have faculty review the exam in the CTC and then do not make changes unless absolutely necessary.
- Waiting until the last minute adds stress to the system and greatly increases the possibility of errors.

Reliability

LESSONS LEARNED:

Maintain tightly controlled and consistent workstations dedicated to testing. You may be strongly tempted to have students test on their own laptops or tablet PC's but this will compromise both security AND reliability.

Reliability

LESSONS LEARNED:

- Have more server resources than you need.
- If possible, devote dedicated servers to both your web app and databases. Otherwise, external applications can dramatically impact your testing software and vice versa.

Reliability

LESSONS LEARNED:

Backup everything frequently and systematically. Don’t solely rely on faculty to backup their exams and question banks.


SCALABILITY

Scalability

CHALLENGE:

Testing with 120 concurrent users poses a far greater demand on your system than testing with 25 concurrent users. However, your users will expect similar performance in both situations.

Scalability

CHALLENGE:

- Large groups also make demands upon the physical infrastructure of the facility itself (power, HVAC).
- Unless you have a dedicated and isolated facility, you must develop a plan for handling noise and traffic flow.

Scalability

LESSONS LEARNED:

When designing all aspects of your CTC, calculate the largest possible class you will ever test at one time and plan accordingly.

Scalability

LESSONS LEARNED:

Stress test for your largest possible class, not your average-sized class. Conduct stress tests every time a major change is made to the system.


SCHEDULING

Scheduling

CHALLENGE:

- There are only so many prime testing hours in a week, especially during high-demand times of the year such as midterms and finals.
- There is always a trade-off between the size of the testing center and ease of scheduling.

Scheduling

CHALLENGE:

Remember that you must be able to accommodate all students under ADA.

Scheduling

LESSONS LEARNED:

Make the facility modular so one can efficiently test multiple exams at the same time or overlapping times when class sizes are small.

Scheduling

LESSONS LEARNED:

- If at all possible, build enough seats to accommodate your largest class + 10% to compensate for malfunctioning workstations and last minute roster changes.
- Have clearly defined scheduling policies that are perceived as equitable.


SUPPORT

Support

CHALLENGE:

- LXR requires a lot from support staff, both in time and knowledge.
- Expanding hours of operation also increases staffing demands.

Support

CHALLENGE:

- Someone must train faculty, students and proctors.
- Workstations must eventually be replaced, usually every 3-5 years.

Support

LESSONS LEARNED:

- Have schools be responsible for proctoring exams.
- Develop a plan and budget for replacing equipment on a regular basis.
- Form a Testing Services team that supports the testing process as a whole and not just a software package or facility.


IMPACT

Impact

- Electronic testing does not necessarily mean you will see a drop in conventional paper-pencil based testing. After five years at KUMC, we've only seen a 10% drop at most.
- Adoption of electronic testing and use of the CTC have grown faster than anticipated. Our CTC has been booked solid for years.

Expansion/Future Directions

- Expand CTC to 203 seats
- Eliminate two wave testing
- This will free up to four hours a day/ 32 hours a semester for testing.

QUESTIONS?