Technology Report
for the
University of Colorado School of Medicine
Undergraduate Medical Education
Curriculum Retreat

7-8 April 2011
This report is a collection of materials and ideas from curriculum leaders and technology staff in Undergraduate Medical Education. There are several parts, listed below, which can be used during the retreat and after.

Themes (p 3)
To prepare for the 2011 Curriculum Retreat the technology group conducted a series of semi-structured interviews with curriculum leaders and support staff. Once all the responses were collected, they were compiled into 3 themes, supporting items are on the pages following. The questions asked were:

What technology tools, applications/ programs, databases (e.g. Illios, Access, Blackboard, sql, etc) are essential to you and your working group?
What are your current technology tools, applications/ programs or databases that are not working well for you or your group?
List any manual process or tedious process that could/should be automated using additional or new technology.
What technology tools, applications/programs, databases do you have that currently connect to other applications/programs, databases, tools?
What technology tools, applications, databases should connect to each other that currently do not?

Tech tool diagrams by process (p 6)
We have diagrammed the technology surrounding the delivery of curriculum and curriculum supporting processes.

Simple process diagrams (p 11)
Linear diagrams that show the major tools and how they work in the curriculum.

Tech tool inventory (p 12)
There is also a list of tech tools compiled with brief descriptions including tools in use and prospective tools.

Technology support structure (p 15)
The Medical Education Technology Alliance (META) is a small group, primarily in UME, who support the technology of undergraduate education. We work with additional school, University and System technology providers in the delivery and support of the curriculum and have diagrammed that.

Education technology poster components

If you have any questions about the technology report or tech that we are using or could use please contact the META members:
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Themes

Our pre-retreat interviews show three areas of concentration:

A centrally organized, globally accessed, data management system to collect, secure, and deliver curricular content, demographic information, and educational progress for the School of Medicine.

[Single, global database] covers items 1, 2, 3, 4, 5, 7, 8, 9, 10, 14 (see next page)

A learner-centered view of education technology, including web-enhanced access to learning content, web-enhanced interactivity between learners and faculty, and a professional network which spans from admission through career.

[Learner-focused education] covers items 8, 9, 10, 11, 12, 13, 14, 15, 16

An open-minded examination of our technology, current and future, to uncover opportunities to enhance our business as well as our instructional processes.

[Technological adeptness] covers items 15, 16, 17, 18, 19, 25, 26

Summary: We seem to be envisioning a learner-centric, learner-focused educational process, supported by technological adeptness and a single global database.
Excerpts from Technology Interviews for Curriculum Retreat Review

1. Central secure and monitored data-base or series of linked databases (Sql), for all UME groups including admissions, student affairs, evaluation data, assessment, student involvement in longitudinal curriculum and electives, faculty teaching responsibilities, etc.

2. A process that keeps the above data up to date and coordinated so that all changes are to core data and are any centrally changed so accurate data is available to all users.

3. Data-based information from central data base is mined and manipulated using Access as a query interface.

4. Access training for key staff would then be needed.

5. CU-SIS data exchange with admissions and student affairs, needs to be accurate and maintained by UME.


7. Course and faculty Evaluation across all years in one web accessible system that tracks courses, clerkship and site of clerkships, Foundations, Longitudinal elements with the ability to look across years, departments, sites, students, faculty, clerkships, sections (a point in time).

8. Centralized (Web accessible) Calendar with multiple levels, and multiple views, that can be personalized for each student to see. It will need to track which student are signed up for which small group, or which tracks etc., and allows faculty to know which student are available at any given time when multiple events are scheduled at the same time. Faculty and staff would have appropriate access for rosters etc. Drag and drop scheduling of people and places.

9. We need a med student, resident, and faculty, and course electronic portfolio capacity, with online gallery for scholarship.

10. Curriculum Content Management- needs to include all four years, core curriculum, electives, tracks, include all four years, batch loading of learning materials and will feed the centralized calendar.

11. Learning Management System – needs to address longitudinal needs of curriculum as well as more course based elements, reliable and include an easy-to-use assignment collection tool.

12. Curriculum mapping tool with visualization capabilities which would integrate with the curriculum content management system.

13. Secure and easy to use on-line examinations.

14. Competency tracking with increased integration to curriculum, assessment, self-assessment and include access to UME database, would feed the e-portfolio.

15. Faculty development modules and resources- web accessible to all faculty including volunteers with completion tracking for faculty portfolios.

16. Coordination of Inter-Professional Education curriculum across all schools and calendars.

17. Learning module creation and support- for med student learning, faculty development.
18. Classroom technology improvements: white boards are difficult to read in the room and on the recordings.

19. Website development and increased references with Learning Management System.

20. UME connection to faculty profile information for students to find mentors and research opportunities.

21. Technology aided efficiencies for common business processes: SharePoint, MS Office, other.

22. Intranet sites for UME units and connections to the rest of the school and campus.

23. Sustainability and replacement plan for workstations and mobile smart devices.

24. Professional network for students, faculty, alumni.

25. Web 2.0 tools for student use and increased max size of student email accounts.

26. Training modules on common tools and productivity tools for students and faculty.
Tech tool diagrams by process

Assessment of Students

portfolio

New Innovations
T-res

Dashed lines are planned elements

Assessment of students

paper

bubble sheet exams

essays/reflective writing

in-person

Clinical exp

CAPE debriefing

CPE

Electronic

Arcadia

CBSE
Evaluation of Faculty and Blocks

- Stats tools, SPSS, excel, Access
- CoursEval
- New Innovations
- Zoomerang
- concept mapping

Evaluation of faculty and blocks

- peer evaluation
- Focus Groups

in person

electronic

- paper
- paper surveys
Curriculum Delivery

*Dashed lines are planned elements*
Scheduling

- Student Scheduling
  - In person
  - Sean Spellman

Electronic options:
- Bb
- 4th yr scheduling app
- Web
- Outlook
- Ilios
- ISIS
- Excel
- Sharepoint
Administrative Collaboration

Curriculum content management system data in and out
Simple Process Diagrams
Tech Tool Inventory

Currently in use

Applicant Reviewer
This is a home-grown application (SOM) which assists the Admissions Office in reviewing all the data associated with applications to the medical school. This is a desk-top application, and as such is limited to a few users. It shares and exchanges data with the Interview Scheduler.

AMCAS
This is the national application system to which all prospective medical students must first apply. AMCAS then sends a feed of data to the member schools containing information for the respective school.
https://www.aamc.org/students/applying/63166/amcas/

Arcadia
Arcadia is the software which runs the entire backbone of CAPE’s computer systems. It handles everything from management and scheduling of sessions to student testing/evaluation/feedback and reports generated to faculty and staff.

Audience Response System (ARS)
The campus uses TurningPoint which functions within PowerPoint and allows respondents to click in with RF devices. The SOM has just invested in ResponseWare which adds web interactivity, with an app or just accessing a site. This can be used in conjunction with the RF keypads.
http://www.turningtechnologies.com/

Blackboard
The SOM uses Blackboard as its learning management system, which is managed by CU Online Downtown. Bb is used for all required blocks in Phases I and II, and some in Phases III and IV.
http://blackboard.cuonline.edu

CHA/PA Supplemental Application
This is web-based software which allows applicants to CHAPA to submit supplemental information for their application. It was created in-house by contract developer Joe Huggins.

COGNOS
This is an enterprise reporting tool used to develop and deliver reports from CU-SIS. The University’s COGNOS installation is managed by UIS, who also provide training and support.

CoursEval
This evaluation tool is supported by ESS and used in the Essentials Core.

DxR
Online patient cases with tools to parallel the patient encounter, a stethoscope, reflex hammer etc. Each discipline has a case or two and the SOM also has the development tool to create more.

ePocrates
Epocrates is a clinical reference library with disease, include diagnostic tests, and drug references, all available on handheld devices. All medical students at the SOM are able to download ePocrates Essentials for free. More than 90% of them do each year.
http://www.epocrates.com/
Ilios 1.0
Ilios 1.0 is a curriculum content management system purchased from UCSF and is currently in use. It delivers the calendar and learning materials to the medical students and tracks teaching hours in the Essentials Core and ICCs.

Interview Scheduler
This is a home-grown application (DISC) which assists the Admissions Office in managing the interview schedules during the admissions season. It is a web site which allows committee members to login to set their available dates to conduct interviews, and applicants to login and confirm an interview date.

CU-SIS
This is the new student information system for the University of Colorado campuses. The product is called Campus Solutions. Oracle is the vendor.

Laptop requirement
Every entering medical student is required to have a laptop to meet standards set each year by the UME IT group. Students are able to purchase for a reasonable rate through vendors approved by the Dean’s Ofc IT Director.

NelNet
This is the payment gateway that the Admissions Office uses to accept credit card payments for the secondary applications. The site is linked from the secondary application site.

New Innovations
This is an online suite of integrated tools, including: evaluation and assessment, competency tracking and scheduling. Both GME and UME currently use NI, UME's use is limited to clinical evaluation/assessment.
http://www.new-innov.com

Ning
UME has a professional network on Ning.
http://ucdenverschoolofmedicine.ning.com/

Panopto
Lecture capture system managed by Educational Support Services. The majority of Phases I and II are recorded and selected didactics in Phase III are also. The system is searchable, looking at PowerPoint slides, and can be sped up to 2X without distortion. Lectures are kept for a year and a semester.

Student Affairs 4th Year Scheduler
This software is a web-based, homegrown (DISC) application which manages the enrollments in the 4th year electives and sub-I’s. Students can manage their own enrollments and Drops/Adds. These can also be managed by the Student Affairs staff.
Applications under consideration

AMP
Application Management Program from ZAP Solutions aims to be a “paperless admissions system” for medical schools. AMP is a web-based online solution designed to simplify the entire medical school admissions process from beginning to end.
http://www.paperlessadmissions.com/About/MedSchools

Electronic Medical Record (EMR)
Both University Hospital and Children’s Hospital use EPIC as their electronic health record. We feel that there are opportunities for incorporating student education with patient care in these systems.

E*Value
E*Value is an online integrated suite of tools, including: evaluation and assessment, e-portfolios, scheduling, and competency tracking.
https://www.e-value.net/

Ilios 2.0
Ilios is a Curriculum Management System which allows users to collect, manage, analyze and deliver curricular information. The new Ilios tracks longitudinal events, learning content and activities over time. Ilios 2.0 manages and tracks both learners and instructors and their relationships to curricular materials and activities, which enables the tracking of educational hours, roles and role transitions for curriculum participants both internal and external to an institution. (Ilios 1.0 has been used since 2005.)
http://www.iliosproject.org/

LearnWise
This is an online textbook. LearnWise works with publishers to provide texts online within the proprietary platform which allows faculty to release specific portions/chapters and add content within the texts. The students would pay a fee to have access to the materials that would be less than buying the paper versions of the books.

MedHub
MedHub is an online integrated suite of tools for GME and UME, which includes: evaluation and assessment, e-portfolios, scheduling, competency tracking, and resident billing.
http://www.medhub.com/

Oasis
Web application designed to facilitate medical school scheduling, record keeping, and curriculum tracking. Maintain real-time access to course rosters, student information, and online evaluation and analysis tools.
http://www.schillingconsulting.com/
Technology coverage

**UME:** Undergraduate Medical Education, including: Admissions, Student Affairs and Curriculum.

**Helen:** Director of Medical Education Technology for UME and responsible for Blackboard, faculty support, UME website, and coordination, liaising and planning.

**Vaquero:** E-curriculum Specialist for UME and responsible for databases, Ilios, SWAE, New Innovations, T-res and home grown apps.

**Tyler:** Director of Information Technology for SOM Dean’s office and responsible for LAN Admin, email, equipment and desktop support.

**Josh:** Information Technology Technician for UME and responsible for student device support, student email, Blackboard, classroom technology and CAPE.

**ATEL:** Academic Technology Enriched Learning and responsible for University of Colorado Denver and Anschutz Medical Campus Blackboard, SWAE and website.

**ITS:** Information Technology Services and responsible for University of Colorado Denver and Anschutz Medical Campus email, campus network and back-up servers

**SPH:** Colorado School of Public Health and responsible for file servers, database server, SharePoint and DISC.

**ESS:** Educational Support Services and responsible for CoursEval, classroom technology, room scheduling and lecture capture (Panopto.)

**UIS:** University Information Services and responsible for system support of CU-SIS and COGNOS.
Curriculum Retreat Education Technology Poster Components

History and Problem

CU SOM educational technology use has grown dramatically since the curriculum revision. Starting in 2005 every entering student was required to have a laptop, and each block in the Essentials Core was required to have a Blackboard course and curricular content managed in Ilios. Standardized web accessible evaluation and assessment, and clinical competency tracking have also been put in place.

This growth is in keeping with national trends to bring the newer technologies of medicine to students and to meet the LCME and other reporting needs. However, this piecemeal growth has occurred to meet emergent needs rather than with an overarching plan.

During their four years here, medical students will interact with at least 14 different technology systems, each with a different access location and user account. Two different systems (New Innovations and CoursEval) are used to evaluate faculty, requiring manual summaries for faculty portfolios. Student competency tracking and student assessment must also be manually summarized. These disconnected systems used inconsistently throughout the blocks of the curriculum, causing confusion and time loss by students and faculty.

Medical Education Technology Alliance (META) has 3 FTE, some additional time from the Director of IT for the Dean’s office (Tyler Schultz), and one additional faculty advisor (Rob Feinstein). This group has been keeping up with the daily needs. We will need increasing resources to keep up with the ever increasing technology needs and requirements and this will become crucial should there be any additional increases in class size.

Methods

Leading up to the curriculum retreat interviews were conducted with curriculum leaders and staff. (See the technology report for the questions and excerpts from those interviews.) Three themes summarize the concerns presented.

The need for:
1) A centrally organized, globally accessible, data management system to collect, secure, and deliver demographic information, curricular content, and educational progress indicators for the School of Medicine.
   [Single, global database]

2) A learner-centered view of education technology; including web-enhanced access to learning content (better delivery), web-enhanced interactivity between learners and faculty (better electronic connection), and a professional network spanning from admission through student tenure, which can also be extended for use by the learner throughout their entire career (development of e-portfolio’s and use of social media.)
[Learner-focused education]

3) An open-minded examination of our technology, current and future, to uncover opportunities to enhance and integrate our educational enterprise, instructional processes, and business operations.

[Technological adeptness]

Summary: We envision a learner-centered, learner-focused educational support process, supported by technological adeptness and a single global database.

Conclusions
Based on these themes and our technology expertise, the Medical Education Technology Alliance (META) has developed a recommendation for an optimal approach to technology going forward.

All educational technology applications will:
• Be available through a web interface,
• Use a single sign-on authenticated with the University account,
• Use an enterprise-level SQL database management (DBMS), rather than Access or other, and
• Connect to a global data set.

Adoption of a learner-centered approach, which will lead to integration and consolidation of systems and reduce barriers to access.

Also, UME will standardize MS Office tools to allow users to reach at least a level of minimum proficiency.

To meet these guidelines and develop additional support levels for an increased class size, additional personnel may be required.
Curriculum Delivery Essentials Core- Current
Curriculum Delivery Clinical Core - Current

Curriculum delivery

Evaluation of curriculum

Evaluation office

Focus groups

Curriculum committees

Faculty

Student

Evaluation

Curriculum delivery

Identification of core competencies

Learning materials

Quizzes

Lecture capture

New Innovations

Evaluation data/reports

Student Affairs office

Phase I preferences

Assessment

MSA plan form

Audience response

T-tes

Scantron

CAPE exam

Bb quizzes (online)

Disc

Shelf exams

Clinical Block Directors and Coordinators

Website

META

Panopto

Blackboard

Panopto announcements

Evaluation
Questions for curriculum retreat participants

What in this model are we missing?

Are there other specific curricular concerns which can be helped with technology?

Do our students and faculty have the technology skills they need to practice medicine today and how should we help all who need it develop them?

What are the top three technology needs you see which need to be addressed in the next academic year? In the next five years?
Notes