Introduction
Introduction

The revolutionary advance in communication, Information technology, e-commerce, multimedia and digital appliances together with the wide availability of hardware to mainstream users has changed the way we live and penetrated every aspect of our day to day life.

The rapid increase in Internet coverage with broadband more than doubling every year. More and more users are reaching the Internet using hand-held devices, depending on location based services and sharing digital content through multiple approaches. Younger generations are becoming knowledgeable about technology and using it frequently in their routine activities.

More students are using mobile devices to access the services of e-learning

However, the adoption of technology has been very slow in educational institutions, has not matched the pace of development or the availability of potential applications. A problem that is depriving the education from very important learning resources.
E-learning represents an innovative shift in the field of learning, providing rapid access to specific knowledge and information. It offers online instruction that can be delivered anytime and anywhere through a wide range of electronic learning solutions such as Web-based courseware, online discussion groups, video and audio streaming, Web chat, online simulations, and virtual mentoring. It enables organizations to transcend distance and other organizational gaps by providing a cohesive virtual learning environment.

E-learning has reached a turning point where learning payoffs can be accelerated. It is also believed that this moment could be fleeting because, without deliberate efforts to coordinate e-learning approaches, we will miss the opportunity to provide effective support for the convergence of learning and technology. The rising tide of sophisticated information and communications technologies driving this shift will not stop rather it will evolve. The pace with which technology is changing is very fast to keep with and we should catch up with.

This has led the kingdom to adopt e-learning as a strategic plan, on all levels of education. With many projects taking effects and lots of others in the pipelines. Qassim University has been one of the first to begin e-learning.
Qassim College of Medicine is one of the leading Colleges to approach e-learning in medical education and to catch up with the demand for development of modern education strategies with many colleges starting e-learning units and delivering digital solutions to students.

The policy was to use technology as one of the pillars of our educational system, to help raise the quality of teaching. We think that this will be a push to the problem based learning approach that is adopted here. Which is student centered and based on collaboration and sharing information; the same principles E-learning is based on.

Not only the short term goal of helping our education, but the long term of creating knowledgeable graduates who are able to stand the challenges of the digital age and acquire the IT skills of tomorrow.

The E-learning unit as a project started in late 2007; the first phase was about research studies, workshops, surveys and meetings with staff and students. It also included training new technologies, contacting companies, getting hands on projects in test. Which helped to make sound judgment of the potential cost-effectiveness, benefit and feasibility.

The E-learning unit was a pioneering project of Qassim College of Medicine, that has achieved national and international recognition and is becoming a leader in e-learning in medical education. Our mission was to bring technology and medicine together; thus creating better contemporary graduates with futuristic minds.

Educating the generation of digital natives is a real challenge most medical schools are unprepared for; thus the adoption of technology as a strategic goal is a top necessity.
Goals and objectives of the unit

• Increasing student engagement in the learning process by encouraging interactivity, problem based and self-directed learning and student production of learning materials.
• Supporting staff in their effective adoption and utilization of new e-learning techniques through training and advice.
• Helping to embed learning materials into clearly defined areas of the curriculum by integrating them into core curriculum objectives.
• Improving the process of self-assessment and feedback by the use of computer aided assessment tools for both formative and summative assessment.
• Establishing a meta data system for digital describing and indexing learning objects, multimedia and computer aided assessment questions.
• Creating a managed learning environment which will provide access to learning resources for undergraduates and staff both on and off campus.

The inauguration of E-learning unit in May 2008.
cont. Goals and objectives of the unit

• Developing a password protected extranet which will provide access to lifelong learning resources for all graduates of the Qassim College of medicine.
• Increasing access to lifelong learning through the greater provision of distance learning modules, primarily through the World Wide Web.
• Consolidating and extending the college’s position as a leading provider of continuing professional development and lifelong learning materials.
• Establish a surveying system that evaluates courses, staff, strategies and provides feedback about all college activities, this feedback will enable students to share their opinions.
• Develop a multimedia station where video recording and audio lectures as well as key events will be recorded, and distributed as video on demand to students, these recordings will be available to as streamed media in real time and on demand.
• Make use of computer based testing in improving assessment and taking the assessment one step further where multimedia is incorporated in the assessment, moreover, new types of assessments will be used to help leverage the assessment process.
The main achievements are

1. Learning management system
2. Clinical Video podcasting and streaming
3. Lecture capture and broadcasting
4. Video conferencing
5. Digital library
6. Computer based testing
7. Digital questions bank
8. Electronic surveys
9. Paperless college and E-communications
10. A modern web site
11. Training and staff development
Learning Management System
Learning Management System (LMS)

LMS is a high-level, strategic solution for planning, delivering, and managing most learning events within an organization, including online, virtual classroom, and instructor-led courses. The focus of an LMS is to manage learners, keeping track of their progress and performance across all types of training activities. It performs heavy-duty administrative and teaching activities.

LMSs are web-based to facilitate “anytime, anyplace, any pace” access to learning content and administration. They are often viewed as being the central point (or critical component) of any e-learning or blended learning program.

One can appreciate the power of combining lectures, videos, assessments, discussions, textbooks, web journals, focused glossaries via wiki’s as well as software to manage user access to the site. When this type of web resource is utilized for course management, a great deal of empowerment is transferred to the student allowing them to pursue self-directed learning.

Moodle; The open source learning management system running our online system
Starting in late 2008, with 5 courses, then 7; rapidly jumping to 24 courses in 5 months

The starting courses back in 2008, note the pages with rich resources.
During the first semester this year 2008-2009 with mass deployment of every course been taught at the college. All courses use online learning in day to day activities and management of educational activities; like Schedules, announces, feedbacks, surveys, communications and learning materials. Courses also included formative exams, forums, assignments, polls, video streaming, audio streaming, glossaries, and chats and many other resources.

The e-learning initiative has been met with great success. Students were enjoying working on the system. Staff felt how helpful e-learning is, and that has led to the rapid growth; which was clear from day to day.
The web site of the E-learning unit now, showing many students online, many resources, courses and links to different subdivisions of the unit.

Continued on the next page
Features of The learning management system with real life examples

Detailed electronic calendar with daily Alerts with activities, a single click on a day will give all this day activities as shown
Latest news section gives the student all updates, it also emails the student with his courses information. An automatic list of all course updates specific to every student to tell him what he happened since he last visited the course.
An organizer desk area where all tables, as they updated are available for students ahead of print. All block booklets, course objectives before the beginning of the block which gives the student a unified place for all course related data.
Online lecture notes in GIT blocks available for download for the student, in all blocks, all lecture notes are available once lecture is given.
Rich online discussions, enables asynchronous interaction between staff and students and give the students an extra chance for training on their own pace.
Polls help explore students' opinions about an opinion in a democratic way, or can even be used as a way to survey students' opinions about a case.
Branching case scenarios, a complex computer algorithm is used to simulate a virtual case


Signs of neurological coma are:

1. Drowsiness
2. confusion
3. nausea
4. vomiting
5. Vision Changes
6. Runny Nose
7. Headache
8. Muscle weakness
9. Fatigue
10. Low blood pressure
11. lateralization
12. aphasia.
13. fixed pupil.
14. sighing, yawning and cheyne-stroke respir.
15. astrexis.
16. dilirium.

Wiki: here the students make their studying materials, in a collaborative way; rather than; so they learn writing skills, teamwork and collaboration.
E-portfolios enable students to submit their materials and get their markings, notes in a simple and private way.
A glossary is a way of teaching students medical terminology online.

Results of online formative exams, a teacher sets the exam and the system does it all.
Follow up of every activity student do with monthly reports, daily reports and topic specific reports.
Student logins during 10 day period, most of the days more than 75% of the students visit the site.
Students in different times of the day, note the large number of students during all day times.
An increasing number of students are using mobile phones to check their courses wherever they are, the next generation mobile learning is here. In the image, mobile phones are the 4th platform to visit the e-learning.

Hits of favourites icon is more than 100%, which denotes how students liked and would like to keep connected.
More than one million hits /month (1366056), an increase of 540% over last period last year.

Last week statistics, note the upgoing curves, denoting increasing numbers of students from day to day, a sign of poppularity and increased interest.
As a proud member of opencourseware consortium, The e-learning unit through its learning management system, opens more than 10 courses to the public where all schedules, booklets, course materials, lecture notes, and our hard work for free to the world, giving a chance of learning from our experience.

Visitors from all over the world- as shown- are coming to our website and learning.
In Numbers
- 870+ lectures online
- 99 courses to date
- 700 users
- 3682 role assignments
- 5400+ discussions
- 70-100% of students are online daily
- 100% of all courses are working with E-learning
- 12 complete courses free for the public containing all course materials.

The way e-learning is utilized in college is revolutionary; in that we have made e-learning a common culture among staff and students; not only some technology oriented engineers manage the content; but all staff members are involved in creating content, managing interaction, communicating with students, releasing grades and many other activities.

All courses in the college are taught with e-learning hand in hand with the teaching in college (Hybrid). and the learning management system now is becoming an essential tool of teaching.
Computer Based Examination
Computer Based Examination

Computer based exams in Qassim College of medicine were started 2 years ago, our approach was to change the face of non-practical exams completely. Changing the whole process in all phases:

- Exam composition
- Exam Deployment and Delivery.
- Exam analysis
- Grade publishing
- Post exam banking and storage of questions

A student having a test in our exam center
Test Creation

Traditionally; exams are written with the help of a word processor, which is time consuming, non-Standard and cannot be searched on criterion based approach. The time taken to format and prepare The final exam draft is tremendous.

We moved to a specialized software, that standardize question types, way of composition, formatting, answers and feedbacks.

Most important feature is that it enables the “tagging” of the question; moreover it enables feedback to be included. The tagging of the question enables easy each, classification, filtration, and creation of exam banks for Re-use.

The whole process of exam creation has been digitized, from the writing to numbering, scoring, tagging and storing in banks.
Exam software provide flexible and easy way of writing Questions, a standardized interface and more options, it also permits for adding a feedback, the feedback allows the student to learn form his exams and to understand rational behind the answers, which is impossible in paper exams. In this application multimedia can be added and hence giving the exam a real life touch.

A simple and standard interface with enhanced features is the base of our system of exam creation which streamlines the process.
Digital exams offer many question types, and allow for flexible assessment.

Multiple and mixed exam questions enable for better assessment.

A sample multiple response question, using traditional techniques, a question of that type is very difficult to grade or to control.
The main advantage of test creation using our methods is to tag the question, using standard criteria like the one described here, you can classify questions, retrieve them based on these criteria, make question banks, and standardize the testing process.

Tagging Questions enables a database with criteria for retrieval and classification (Bank)

Using standard criteria to create the questions, tag them, and validate them according to post test analysis the exams are better, more reliable, and of higher quality.
A student performing an exam in the exam center, the multimedia featured is an advantage of the computerized exams

As shown before, we have changed completely every little step in exam creation so our exams have become:

1. Easy to write
2. Standardized types
3. Can be automatically randomized
4. Feedback
5. Rationals
6. Flexible layouts
7. Tagging and description
8. Question banks possible
9. Multimedia can be included
10. Time management
11. Flexible scoring
12. Question weight
Test deployment

In Qassim College of Medicine, we have constructed a lab for examination; the lab automates the whole process. All the student has to do is sit and examine and they have the results ready within one second of finishing the exam with 0 papers.

The students doing an e-exam in our lab
A screenshot of an exam run in our lab, note the multiple question
types, the time management and the flexible scoring; some questions
are have only one mark while others have 3 marks.

Student are able to see instant feedback after each quiz so that they can
understand new concepts and learn from their mistakes, which could
improve their learning.
Results are recorded seconds after students finish exams, saving long times of work and calculations and minimizing errors.

In E-Exams students are able to take exams multiple times, and so they will gain knowledge and learn by exams.
**The advantages of delivering exams using our exam lab**

1. Complex animation and computer graphics or videos can be used to test near real life situation which is impossible to test on papers.
2. The ability to give questions certain weights, this weight may even differ inside the choices of an MCQ and even a negative mark can be given to certain answers.
3. The automation of the whole examination process.
4. The low cost of saving thousands of papers and high running costs of usual exams.
5. The ability to offer tests on demand at times convenient for your candidates.
6. Test questions can be created in ‘banks’ and delivered at random, cutting out ‘battery’ testing, i.e. the need to test all candidates at the same time on the same day.
7. Elimination of complex logistics problems, such as the distribution, storage and tracking of test papers.
8. Tests can be taken independently of an internet connection, so system failure is minimized.
9. Reduction in the time-consuming job of scoring tests and preparing hand written reports.
10. Instant results and immediate diagnostic feedback indicating the candidate’s strengths and areas for improvement.
11. Randomization of questions options and exams so it is difficult to cheat.
12. Once test finished all results are ready.
Post-exam

Given the analytic power of the computer, the system gives very detailed information that helps analyze the students data which help improve both learning and exams.

<table>
<thead>
<tr>
<th>Q#</th>
<th>Question text</th>
<th>partial credit</th>
<th>R. Counts</th>
<th>R.%</th>
<th>% Correct Facility</th>
<th>SD</th>
<th>Disc. Index</th>
<th>Disc. Coeff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(156)</td>
<td>The rotator cuff is composed off which of the following? : The rotator cuff is composed off which of the following?</td>
<td>(0.00)</td>
<td>0/32</td>
<td>(0%)</td>
<td>94%</td>
<td>0.246</td>
<td>-0.44</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.00)</td>
<td>1/32</td>
<td>(3%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.00)</td>
<td>0/32</td>
<td>(0%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(170)</td>
<td>All of the following are commonly believed to be risk factors for avascular necrosis of the femoral head except : All of the following are commonly believed to be risk factors for avascular necrosis of the femoral head except</td>
<td>(0.00)</td>
<td>12/32</td>
<td>(36%)</td>
<td>41%</td>
<td>0.482</td>
<td>0.04</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.00)</td>
<td>1/32</td>
<td>(3%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.00)</td>
<td>1/32</td>
<td>(3%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(147)</td>
<td>Origin of bone is from :</td>
<td>(0.00)</td>
<td>2/32</td>
<td>(6%)</td>
<td>67%</td>
<td>0.462</td>
<td>-0.00</td>
<td>0.53</td>
</tr>
</tbody>
</table>

Each question statistics are calculated, these parameters will decide the validity of the question and its place in question banks, invalid questions will be deleted and exams will be regraded.
Post exam analysis will filter questions and they will find their way to the bank or deleted, thus keeping a high quality bank.
Questions can be retrieved according to the criteria, hence; a balanced exam can be made reliably in short time
In Numbers

- Twenty final exams have been successfully done in the last year.
- An exam bank for the past two years carrying hundreds of filtered and high quality questions.
- Local exam banks have been created in departments like medicine, and psychiatry.
- The exam center offers services to other colleges, so they use the center in their exams.
- The exam center has served as an example and proof of concept that stimulated other similar project.
- The success of exam bank has initiated a nation wide proposal for a kingdom wise projects.
E-Surveys
E-Surveys

Surveys are powerful tool for assessment, feedback, monitoring of current work and provides the necessary information planning of future projects. In Qassim college of medicine we have an outstanding surveying system that comprises many technologies and has done more that a hundred surveys. The system operates mostly online. And has been used to collect responses from students, graduates, staff and other parties. The following are samples and types of surveys we do.

101 Course evaluation surveys, with different online systems
Yearly, with the automated system we do program evaluation from different sides, the surveys are collected online from responders allover the world, which is impossible to do with traditional methods.
Surveys are used to get feedback and communicate students' opinion in all emerging issues in a timely fashion.
In Brief

• 120+ Surveys and counting
• Surveys evaluating every course running in college
• Graduates evaluations
• Program evaluations
• Feedbacks
• Polls
• An estimated analysis of 24000 pages data available to decision makers.
• Different systems from wireless devices to online based makes the process fail safe.
Multimedia
Multimedia

Multimedia, brings live demonstrations on demand any time, and any where. Think of a class of how to examine the abdomen. Whenever it ends. No one can get it back and reading it in books will bring only dull description.

Our approach was to provide students with all physical examination and clinical skills procedures online for download or streaming.

Web site for downloading videos of examinations (2 sets) or watching online
Clinical skills videos available for download

(Third set)
Our Videos on Itunes for podcasting
Videos for staff

Not only we provide videos for the students, we record videos of seminars and important workshops and make them available online so that they have access to them whenever they want them.
In Numbers

- Two web sites for downloading clinical examination videos and for real time streaming, having three sets of clinical examinations videos.
- An Itunes podcasting service for clinical examinations.
- A web site for recorded lectures and seminars.
- All of the following are available on DVD and CDs.
- More than 2000 downloads/month from all over the world.
E-Communications and Website
Paperless instant communication

Staff members communicate totally with emails. All college updates and documents are distributed exclusively via emails, saving thousands of pages weekly and connecting all college staff who works on widely spaced cities.

Committees have email lists making communications at a click of a mouse. Departments too communicate through emails lists.

All staff members have official emails at college email and we have a central contact address book that enable them to mail each others without memorising.

<table>
<thead>
<tr>
<th>Name</th>
<th>Email address</th>
</tr>
</thead>
<tbody>
<tr>
<td>aliouf</td>
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<tr>
<td>surgery</td>
<td><a href="mailto:surgery@qumed.org">surgery@qumed.org</a></td>
</tr>
</tbody>
</table>

An image of some of the email lists available at the college, all college correspondence is done through email.
A modern website for delivery of services and giving a central place to access the all resources and to connect with our graduates and alumni.
Training
Training

The key success to our work is training and investment in human resources so we employed the following:

- Workshops; till now 11 workshops in 2 years.
- Manuals
- DVD of software simulation
- Website for delivery of training videos
- Personal communication and special sessions.

Manuals for E-learning and detailed documentations
We have produced simulation videos in our unit, explaining every step of dealing with e-learning. And made them available online and on DVDs. Imagine you want to start a discussion forum and did some wrong step. Simply visit a web site and download or watch a simulation video online.
Why our E-learning is unique

• Only few colleges around the world has achieved 100% use of e-learning in its courses, those few colleges are mostly technical, and very few colleges of medicine has achieved success with e-learning. Qassim College of Medicine is proud to have this pioneering role.

• The way e-learning is utilized in college is revolutionary; in that we have made e-learning a common culture among staff and students; not only some technology oriented engineers manage the content; but all staff members are involved in creating content, managing interaction, communicating with students, releasing grades and many other activities.

• All of the systems have been developed in house. No external sources involved. The college staff (Doctors) do the upgrade, maintenance and day to day help.

• All of the software used is open source which is free and has no support involved, we have proven that community projects are viable and represent an alternative solution for the highly expensive commercial solutions.

• The cost of all the online technologies are below 100$/year.

• No single contribution by any company or any support of any kind outside the college, all support and planning is done by staff members.

• We have changed the whole assessment process to use digital examination. our exam lab is being copied in other colleges, the question bank will be generalized in the kingdom.

• Surveys and feedbacks have become the base of decision making in college, due to the work done in e-learning of making this hundred and more surveys.

• E-communications are the standard way of communications. Paving the way for a greener paperless college.

• Our pioneering project has been used as an example for others, and we helped others to follow our path.

• We are the only college of medicine in the kingdom that gives 12 complete online courses for free as part of our open course ware consortium.

• As a college we have produced simulation videos, DVDs, manuals, booklets, e-learning workshops and we give them online for free to the world.