AHPE lecture
in collaboration with
MEUINDIA

Technology /Artificial Wisdom for Medical Education especially CBME

March 28 2020. at 6 PM

Prof Arun Jamkar

President AHPE
and
Ex Vice-Chancellor of
Maharashtra University of Health Sciences

- Prof Dr Arun Jamkar,
  M.S. Ph D (Surgical Oncology),FICS, FIAGES, FMAS, FAIMER fellow
- Ex Vice Chancellor, Maharashtra university of Health sciences, Nashik
- **Consultant , Persistent Systems ltd, Pune**
- Chief Medical Officer Index Technology, Cupertino, USA
- Director, Post graduate programme, Research and Development, MIT group of Medical Colleges Pune
- Director Academics, Galaxy care hospitals Pune
- Ex Dean, B J Medical College Pune and RCSM Govt Medical College Kolhapur

What we have done in field of Competency Based Medical education CBME in MUHS Before BOG implemented CBME

UG and PG education in Faculty of Medicine

- Organized workshops for sensitizing faculty under leadership of Dr N G Patil from university of Hong Kong.
- Several BOS were active and passed resolutions and appointed technical committee to create new curriculum.
- Super specialty boards were active but some resistance was there.

Scenario based question papers

- Getting away from Recall type of question papers
- Academic council passed resolution to shift on scenario based question papers up to 50%
- MCQs to be scenario based

CBME in Curriculum of Fellowship Programmes



- University fellowships PROGRAMME have flexibility of implementing at university level.
- Appointed one coordinator in each fellowship programme to convert into CBME
- All new fellowship Programmes were insisted to be in CBME format
- Encouraging response from faculty

MHPE Programme on Competency based Education

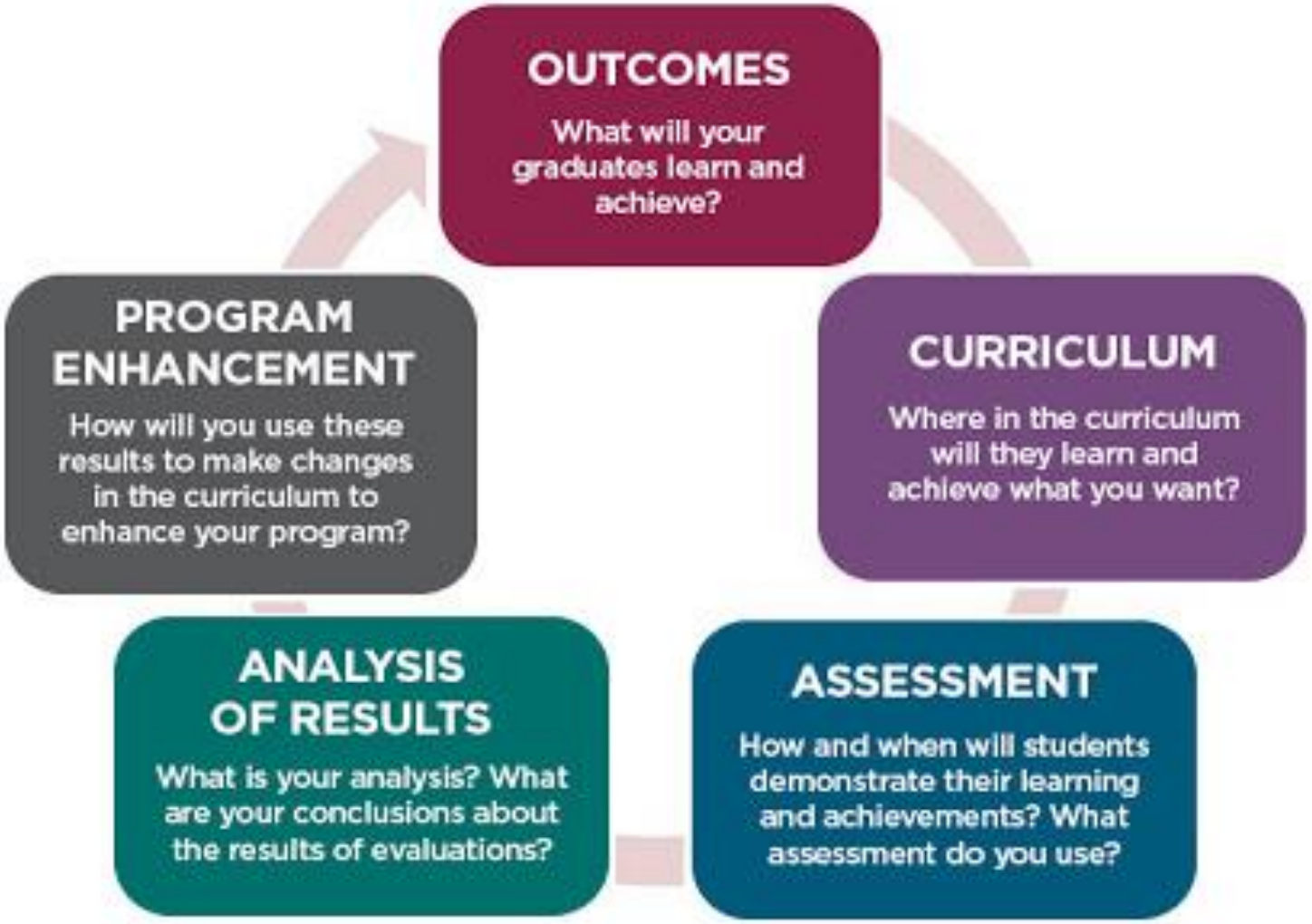


MOU **Obama-Singh 21st Century Knowledge Initiative,** a collaborative project between **Maharashtra University of Health Sciences** and **University of Michigan** for the joint development of a Master's Degree in education for health professions faculty in the US and India .

Extending the Principals to Ayurveda

- **Participated in 6th World Ayurved Congress and conducted a workshop on CBME and how it can be extended to Ayurveda**




OUTCOMES
What will your graduates learn and achieve?
CURRICULUM
Where in the curriculum will they learn and achieve what you want?
ASSESSMENT
How and when will students demonstrate their learning and achievements? What assessment do you use?
ANALYSIS OF RESULTS
What is your analysis? What are your conclusions about the results of evaluations?
PROGRAM ENHANCEMENT
How will you use these results to make changes in the curriculum to enhance your program?

Competency-frameworks



CanMeds

- Medical expert
- Communicator
- Collaborator
- Manager
- Health advocate
- Scholar
- Professional



ACGME

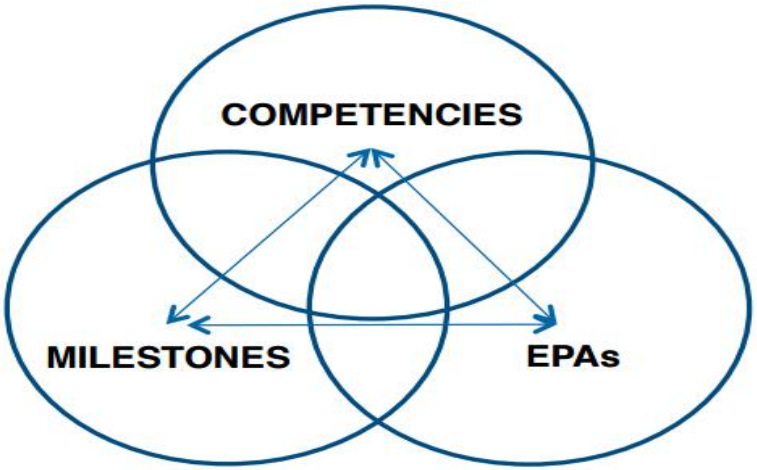
- Medical knowledge
- Patient care
- Practice-based learning & improvement
- Interpersonal and communication skills
- Professionalism
- Systems-based practice



GMC

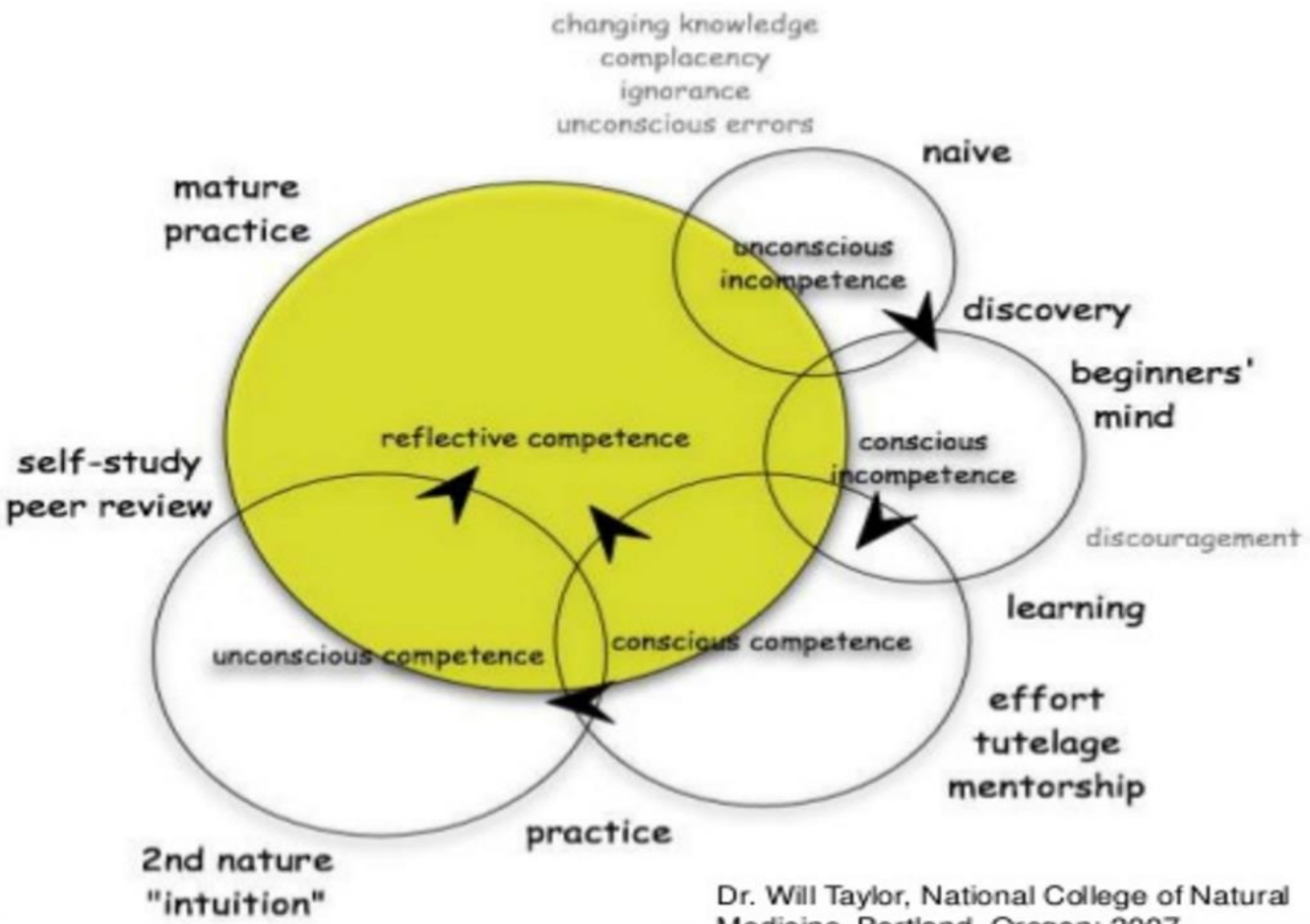
- Good clinical care
- Relationships with patients and families
- Working with colleagues
- Managing the workplace
- Social responsibility and accountability
- Professionalism

Competencies, Milestones and EPAs



Characteristic	Competencies	Milestones	EPAs
Granularity	Low	Moderate to High	Low to Moderate
Synthetic/Integrated	Moderate	Low to Moderate	High
Practicality (application)	Low	Moderate	High
Conceptual	High	Low	Low to Moderate

MODEL: COMPETENCY DEVELOPMENT



Dr. Will Taylor, National College of Natural Medicine, Portland, Oregon; 2007

Requires:
Time
Self-Awareness
Mentorship
Access to resources

Outcome based Education based On competency mapping and monitoring

Topics & outcomes in Pre-clinical & Para-clinical subjects

Sr. No.	Subjects	Number of topics	Number of outcomes
1	Human Anatomy	82	409
2	Physiology	11	137
3	Biochemistry	11	89
4	Pharmacology	5	85
5	Pathology	36	182
6	Microbiology	8	54
7	Forensic Medicine & Toxicology	14	162
	Total	167	1118

Topics & outcomes in Medicine and Allied subjects

Sr. No.	Subjects	Number of topics	Number of outcomes
1	Community Medicine	20	107
2	General Medicine	26	506
3	Respiratory Medicine	2	47
4	Paediatrics	35	406
5	Psychiatry	19	117
6	Dermatology, Venereology & Leprosy	18	73
7	Physical Medicine & Rehabilitation	9	43
	Total	129	1299

Topics & outcomes in Surgery and Allied subjects

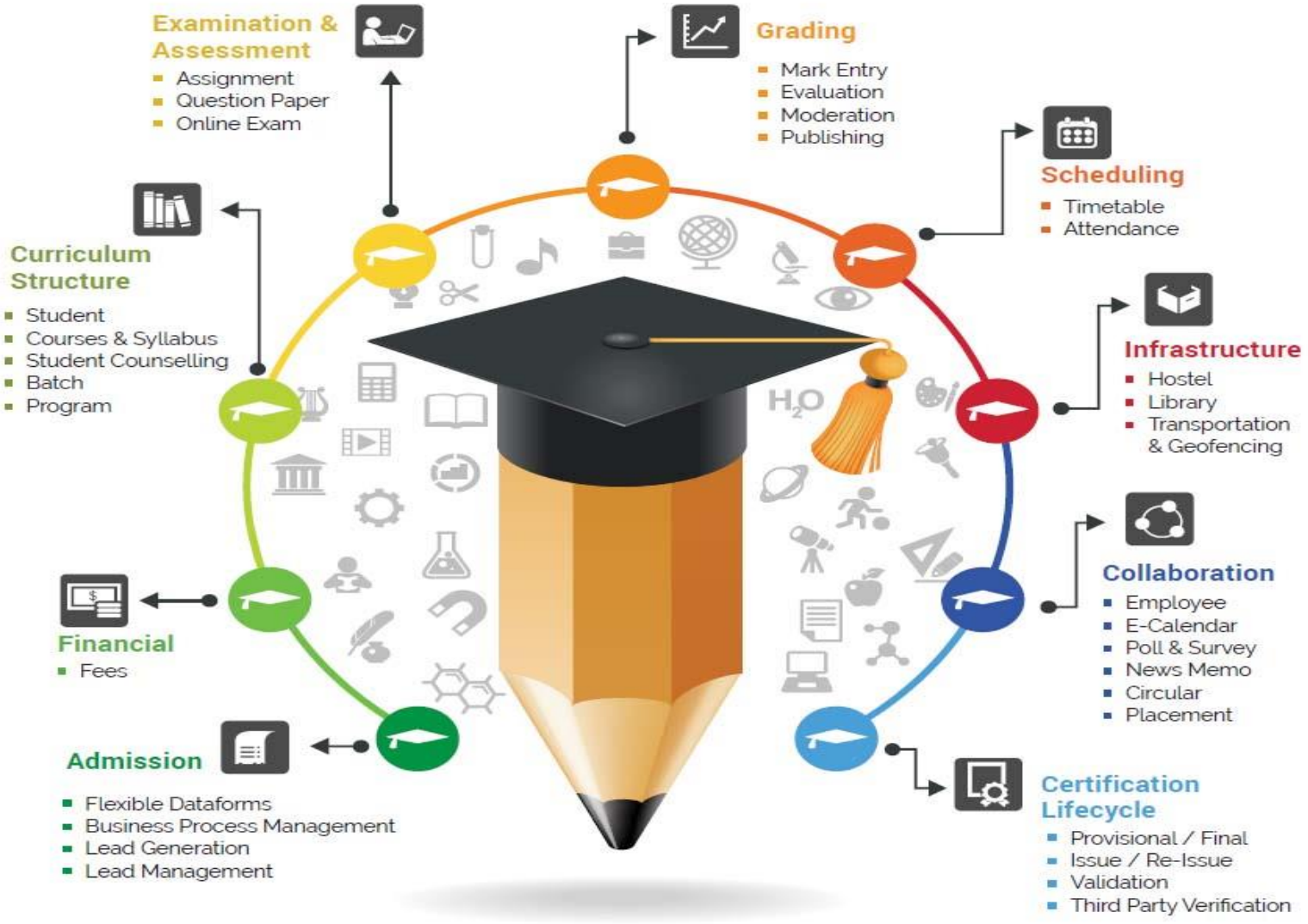
Subjects	Number of topics	Number of outcomes
General Surgery	30	183
Ophthalmology	09	60
Otorhinolaryngology	04	76
Obstetrics & Gynaecology	38	126
Orthopaedics	14	39
Anaesthesiology	10	46
Radiodiagnosis	01	13
Radiotherapy	05	16
Dentistry	05	23
Total	**116**	**532**

Medical Education and Health care needs
Augmented Intelligence leading to
Artificial wisdom

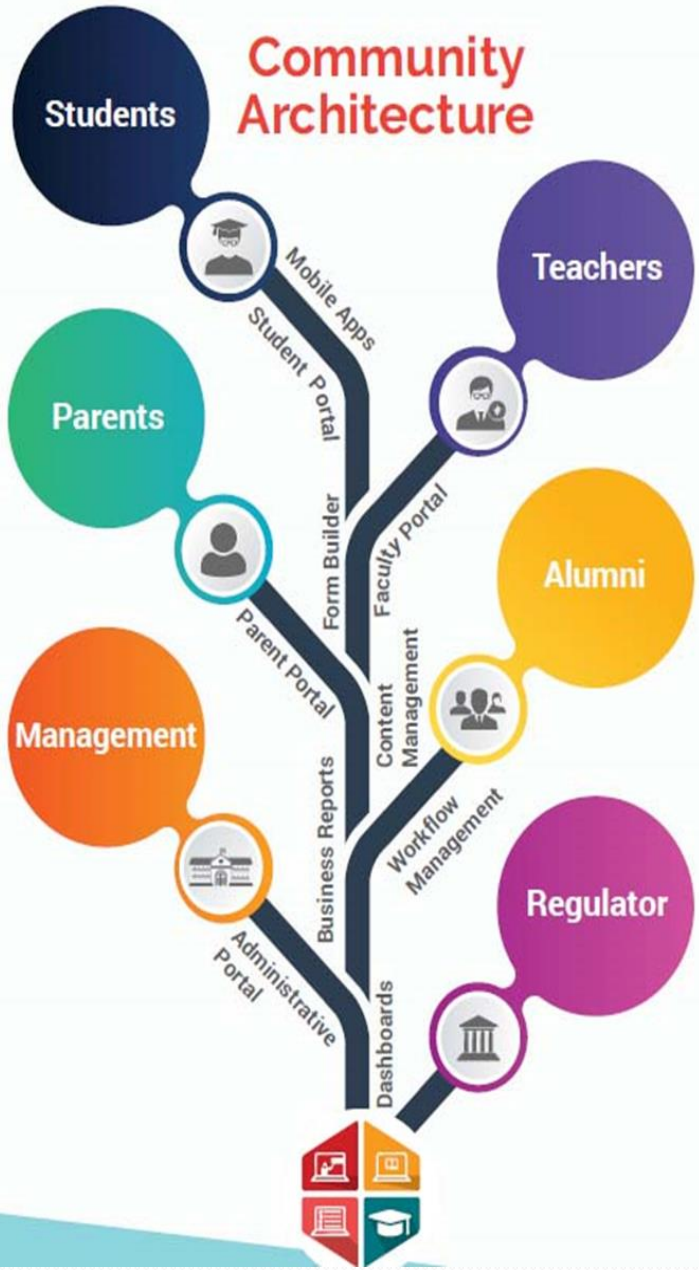
www.arunjamkar.com



Academic Ecosystem




Today
Can I get the consolidated payment details
I was busy with administrative works
Management
Administration
I want an MIS Report
I have sent the Excel file
We are preparing documents
Management
Administration
Faculty
I need more resources to do all administrative work related to student
I have some concerns
Parent
Students
Administration
I am busy, I need to examine all student documents
I need an appointment with you
Faculty
Students
We will check & get back ASAP
Administration
My daughter is not yet reached home
Parent
Digital Divide
Tomorrow
Quick data access
Bird-eye View
Connecting
Communities
Digitalization
Structured
& Unstructured
Management
Parent
Administration
Student
FUTURE
Faculty
Alumni
Regulator
Student tracking &
alerts
Transparency
Role based
Information
Zero
redundancy
Better
Utilization
of Resources


Community
Architecture
Students
Teachers
Parents
Alumni
Management
Regulator
Mobile Apps
Student Portal
Form Builder
Faculty Portal
Parent Portal
Content Management
Business Reports
Workflow Management
Administrative Portal
Dashboards

AIMS

HOME ABOUT AIMS FEATURES WHAT MAKES AIMS UNIQUE? WHO WE ARE? REQUEST FOR A DEMO CONTACT US

A futuristic Solution for

Academic, Administrative & Campus Management

for Educational Institutions

Multiple stakeholders | One Platform

Request for Demo | View eBrochure



Feedback

About AIMS

The Academic Institute Management System (AIMS) is a multi-location, multi-syllabi and multi-institute academic institution management system that is designed on a modern, cloud based, multi-tenant architecture. **AIMS** can be anywhere as you like, such as any geography or any devices of your choice. Students, faculty and staff members of your institute now can perform all their duties and many more activities through a single window which includes web, mobile and other devices.

Curriculum Structure | Assessment & Progression | Scheduling

AIMS Features

AIMS is designed very intuitively to understand the roles of any user and selectively provide the options to navigate to required academic, administrative or other ancillary processes of the system.

Mobile Apps

Being a responsive application, it is quite compatible and versatile with all kinds of mobile devices



Dashboards

Enables the organization to track overall metrics & performance scorecards on a single screen

Business Reports

All sorts of business reports are just click away through this application now

Form Builder

Designing various forms and making payments through secure gateway are just click away with this utility

AIMS Features

AIMS is designed very intuitively to understand the roles of any user and selectively provide the options to navigate to required academic, administrative or other ancillary processes of the system.

Student Portal

Dedicated site access for the students for their end to end activities & deliverables



Administrative Portal

Enables an individual to govern the entire system smoothly and as per one's eligibility

Faculty Portal

Equips faculty members to manage their complete set of tasks and actions

Parent Portal

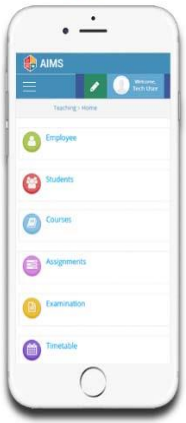
Gives complete visibility to parents to track their kids, be it location, academic performance or anything else!

AIMS Features

AIMS is designed very intuitively to understand the roles of any user and selectively provide the options to navigate to required academic, administrative or other ancillary processes of the system.

Template Based Website

This vast application also offers the facility of various ready to use templates, which can be used to design lucrative websites



Workflow Management

Provides enough platform and scope for the set-up, performance and monitoring of a defined sequence of tasks for optimized performance and cost

FREE ONLINE EDUCATION

swayam

शिक्षित भारत, उन्नत भारत

NPTEL

National Programme on Technology Enhanced Learning

KNOWLEDGE IS FREE

26	1300	6335382	627866	464093
Partnering Institutes	Completed Courses	Student Enrollment	Exam Registrations	Successful Certification



VIEW COURSE CATALOG

NPTEL

National Programme on Technology Enhanced Learning (***NPTEL***) is a project of MHRD initiated by seven Indian Institutes of Technology (**Bombay, Delhi, Kanpur, Kharagpur, Madras, Guwahati and Roorkee**) along with the Indian Institute of Science, Bangalore in 2003, to provide quality education to anyone interested in learning from the IITs. The main goal was to create web and video courses in all major branches of engineering and physical sciences at the undergraduate and postgraduate levels and management courses at the postgraduate level.

HIGHLIGHTS

Largest online repository in the world of courses in engineering, basic sciences, and selected humanities and social sciences subjects

Online web portal http://nptel.ac.in – more than **471 million+ views**

Youtube channel for NPTEL – most subscribed educational channel, **1.5 million+ channel subscribers, 404 million+ views**

More than **56000 hours** of video content, transcribed with subtitles

nptel.ac.in

NPTEL, IC & SR Building, 3rd floor, IIT Madras - 600036

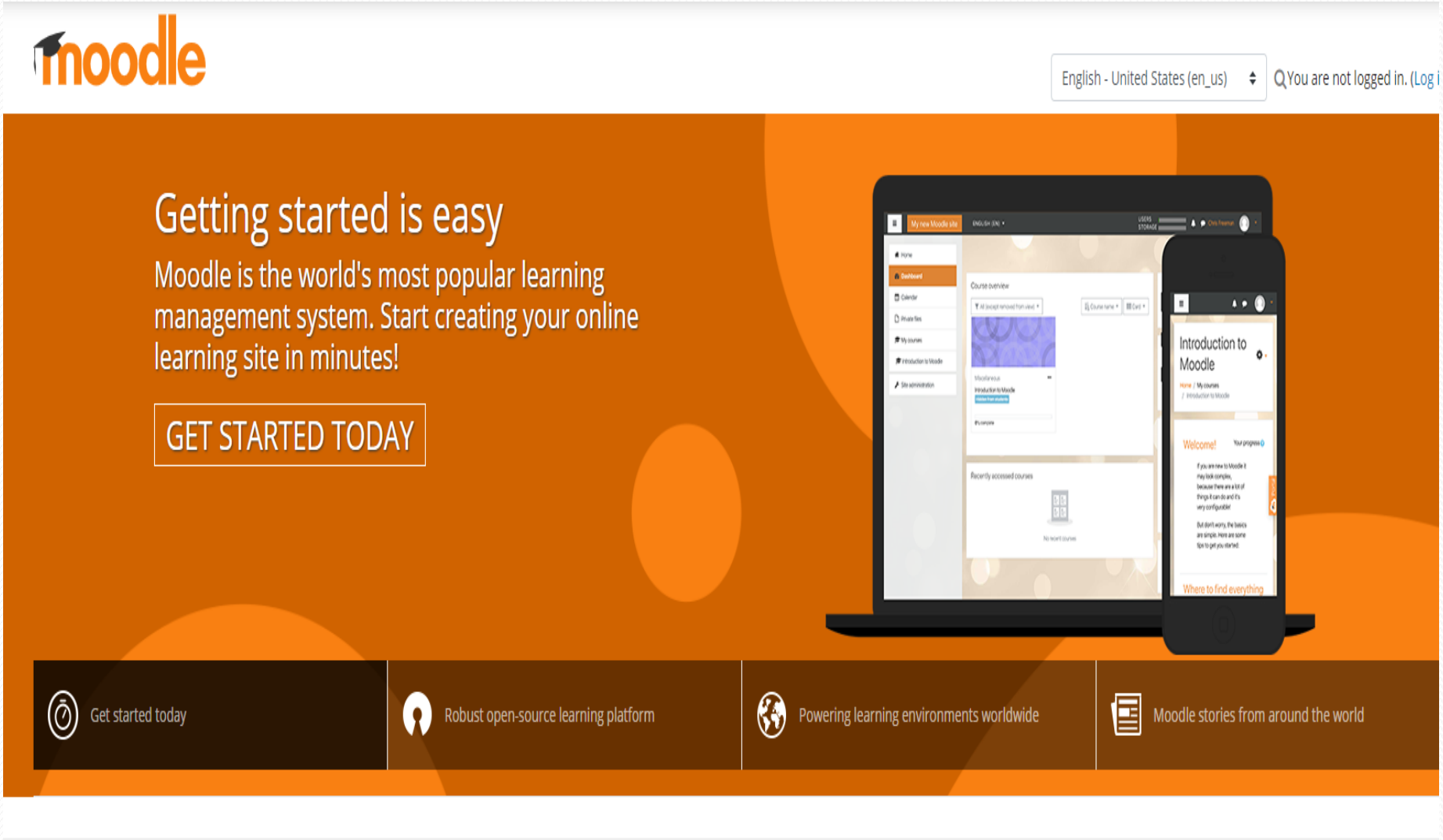
| support@nptel.iitm.ac.in

| 044-22575905/5908

ONGOING SEMESTER STATS

No. of Courses	359
Students Enrolled	1827564
Exam Registrations	179096

Existing platforms are:-

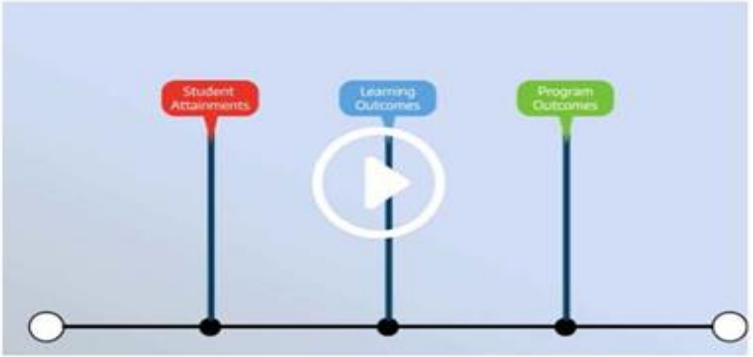


HOME PRODUCTS SOLUTIONS ABOUT US CONTACT US REQUEST FOR DEMO

Are you ready for Outcome Based Education?

InPods with its seamlessly integrated solutions enables the best learning experience.

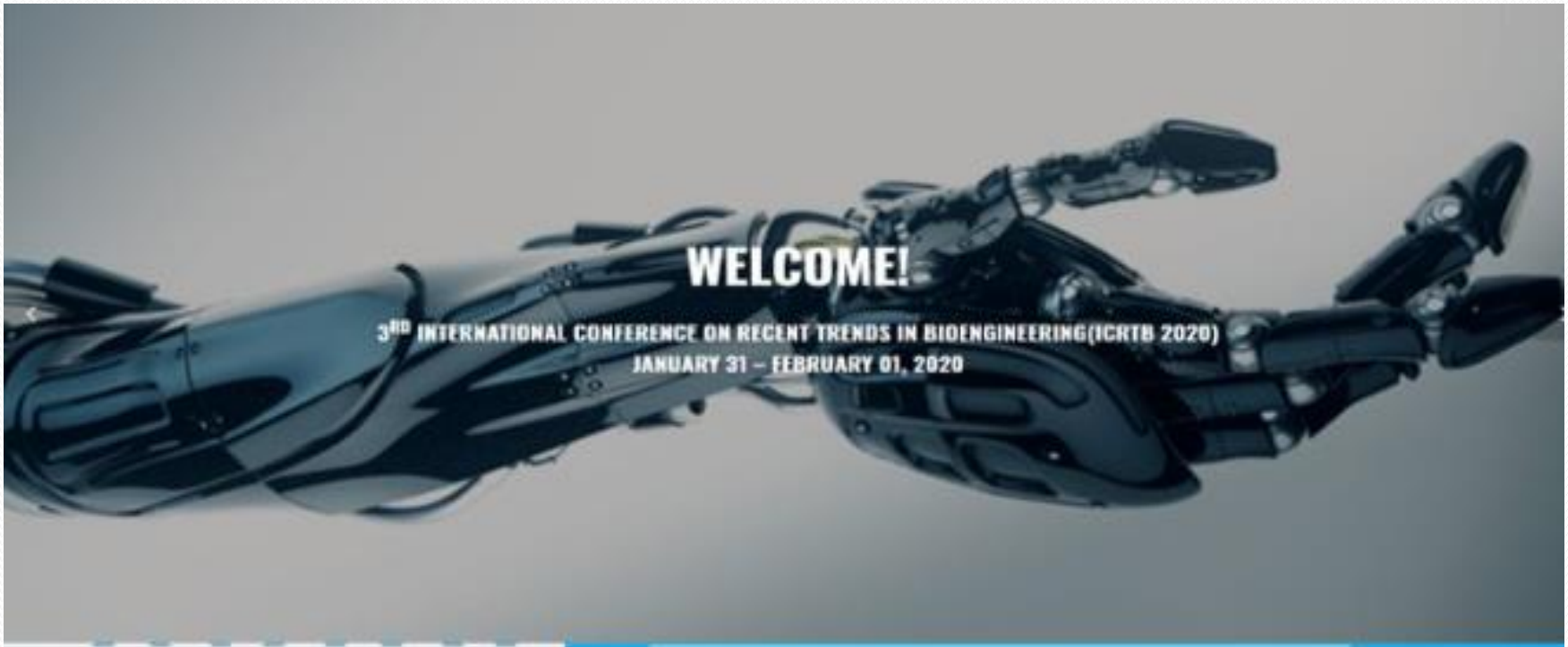




Discover

InPods isn't just another product. InPods is a learning platform to manage the entire life-cycle of Outcome – Based Education (OBE) & Skill – Based Training.

More



MIT School of
Bioengineering Sciences & Research
Breathe Life into Engineering Career!

ARTIFICIAL INTELLIGENCE FOR BETTER HEALTH CARE

IAGES

SILVER JUBILEE CELEBRATION

1st INTERNATIONAL CRUISE CONFERENCE

onboard Costa Neoriviera

Kochi (India) - Male (Maldives)
12th - 15th December 2018

Organised by
Indian Association of
Gastro-intestinal Endo Surgeons

in association with
Maldives Association of Surgeons





PERSISTENT

GAPIO
Global Association of Physicians of Indian Origin

GLOBAL ASSOCIATION OF PHYSICIANS OF INDIAN ORIGIN (GAPIO)

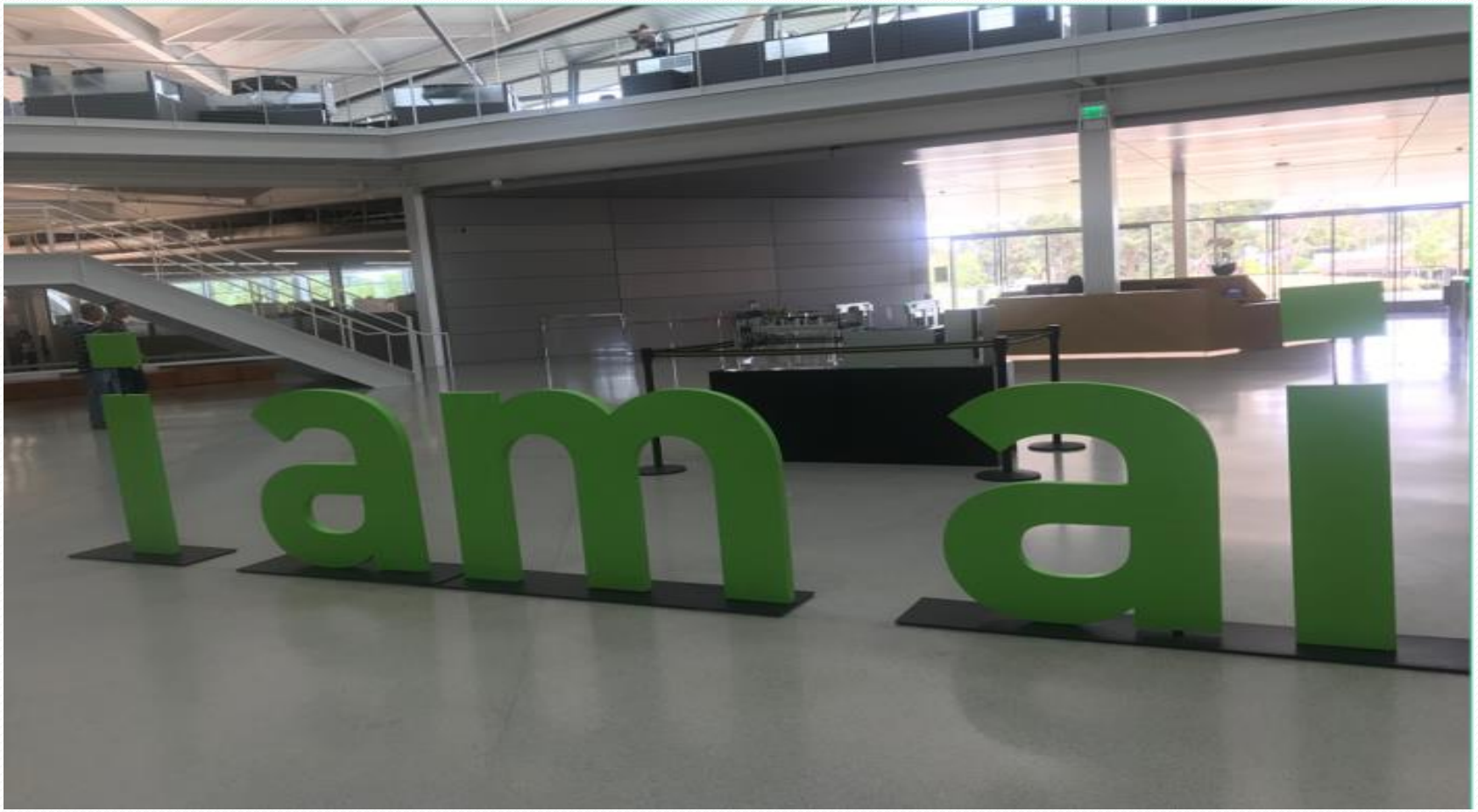
"Improving Health Worldwide"

- **Pt. B.D. Sharma University of Health Sciences, Rohtak (India)**
  British Associations of Physicians of India Origin
  University of South Wales, UK

INDO-UK SYMPOSIUM

Role of Technology in Making Healthcare Affordable

I am AI



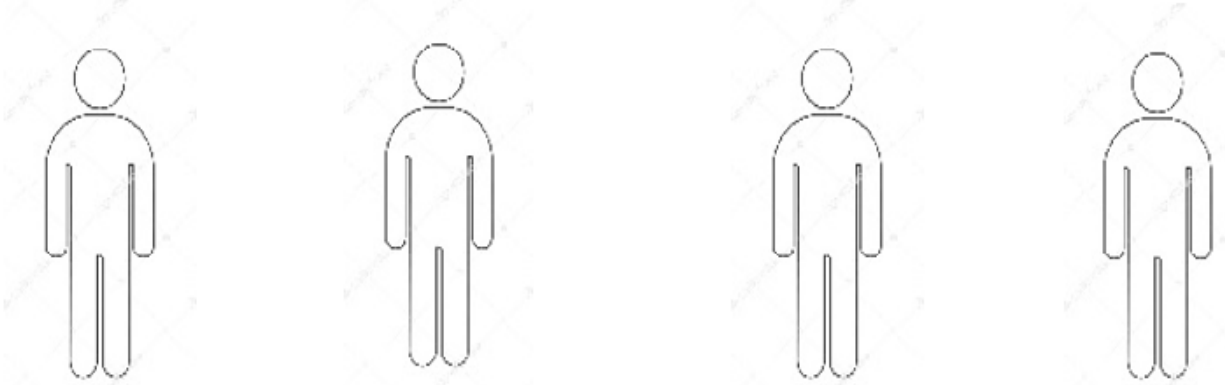


The Internet Of Things (Iot) Is The Network Of Devices, Vehicles, And Home Appliances That Contain Electronics, Software, Actuators, And Connectivity Which Allows These Things To Connect, Interact And Exchange Data.

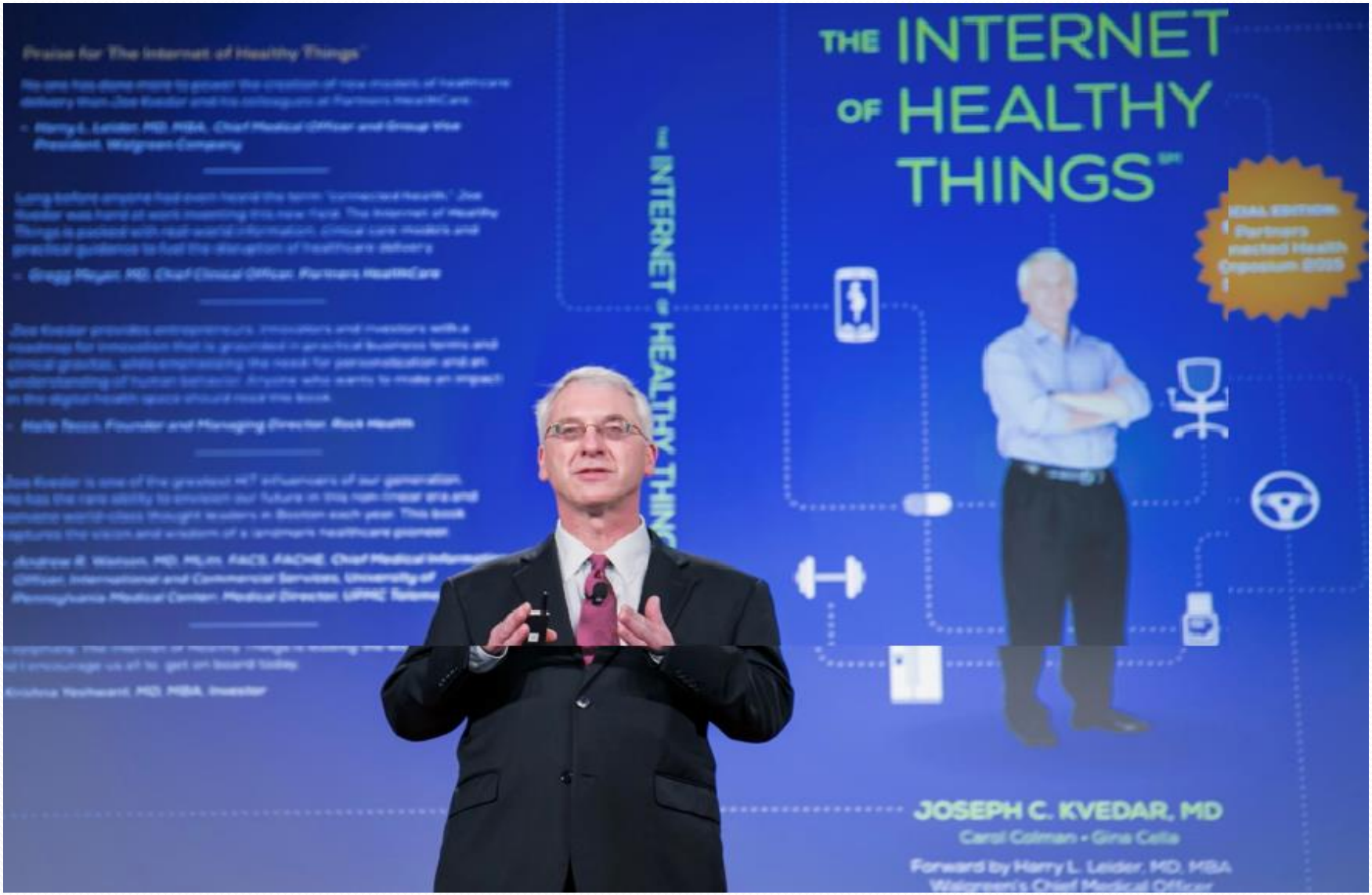
Kuva 1. Internet of Things. Lähde: Huffington Post

IOT IS EXPLODING

World Population	6.3 billion	6.8 billion	7.2 billion	7.8 billion
Connected Devices	500 million	12.8 Billion	20 Billion	50 Billion



Devices /Person	0.08	1.84	3.47	6.58
	2003	2010	2015	2020


THE INTERNET OF HEALTHY THINGS
JOSEPH C. KVEDAR, MD
Carol Colman • Gina Colla
Forward by Harry L. Leider, MD, MBA

IoT in Healthcare

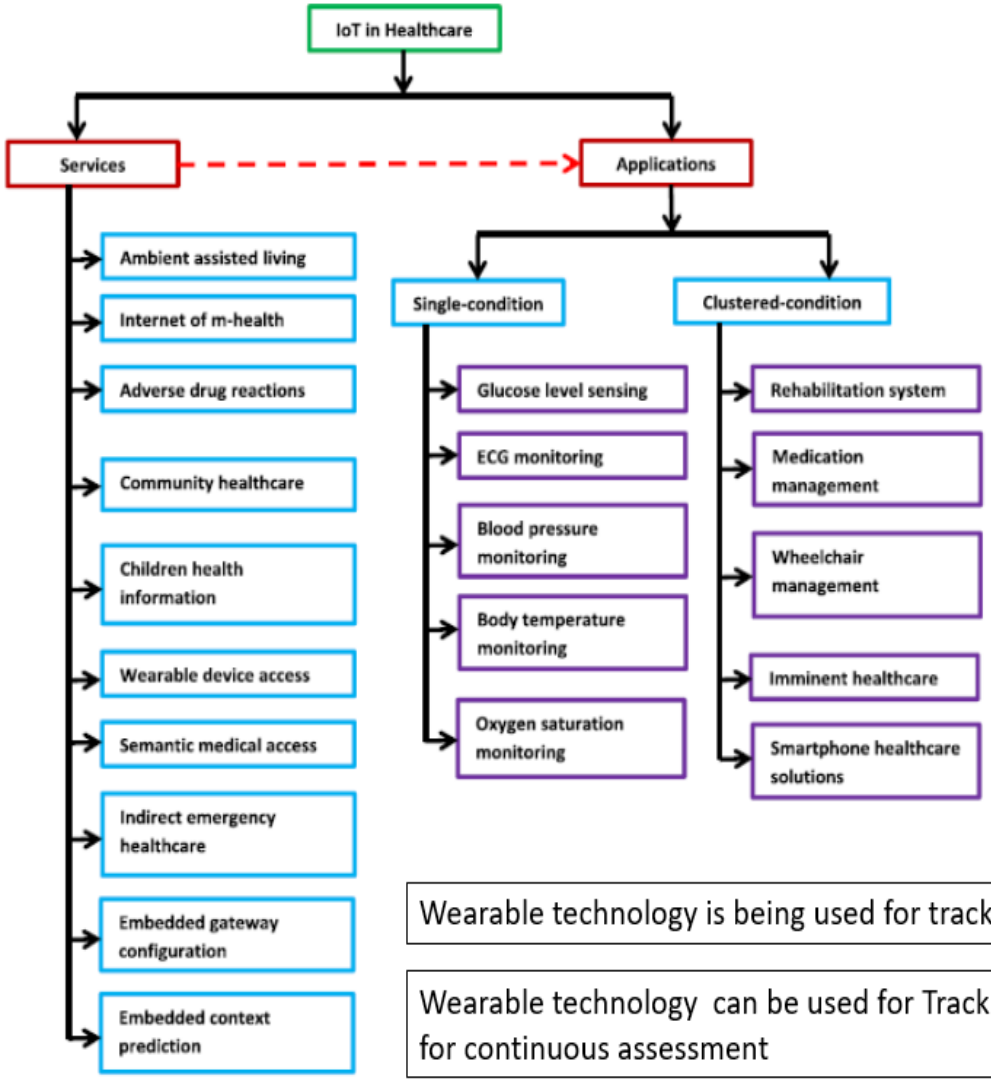
IoT in Healthcare is a heterogeneous computing, wirelessly communicating system of apps and devices that connects patients and health providers to diagnose, monitor, track and store vital statistics and medical information.

Few examples of IoT in Healthcare

- Headsets that measure brainwaves
- Clothes with sensing devices
- BP monitors
- Glucose monitors
- ECG monitors
- Pulse oximeters
- Sensors embedded in medical equipment, dispensing systems, surgical robots and device implants
- Any wearable technology device……..



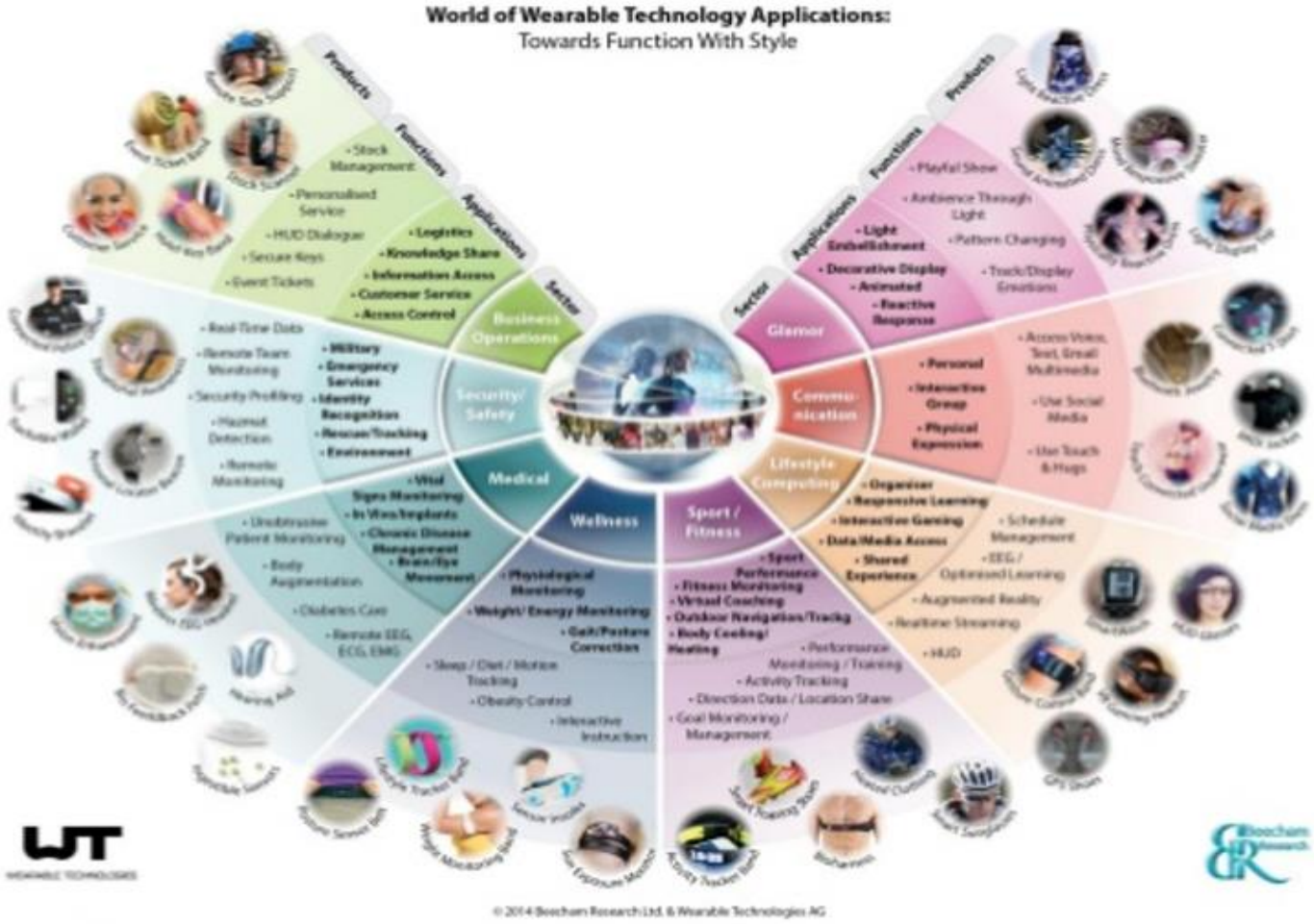
IoT healthcare services and applications



Wearable technology is being used for tracking in Corona epidemic

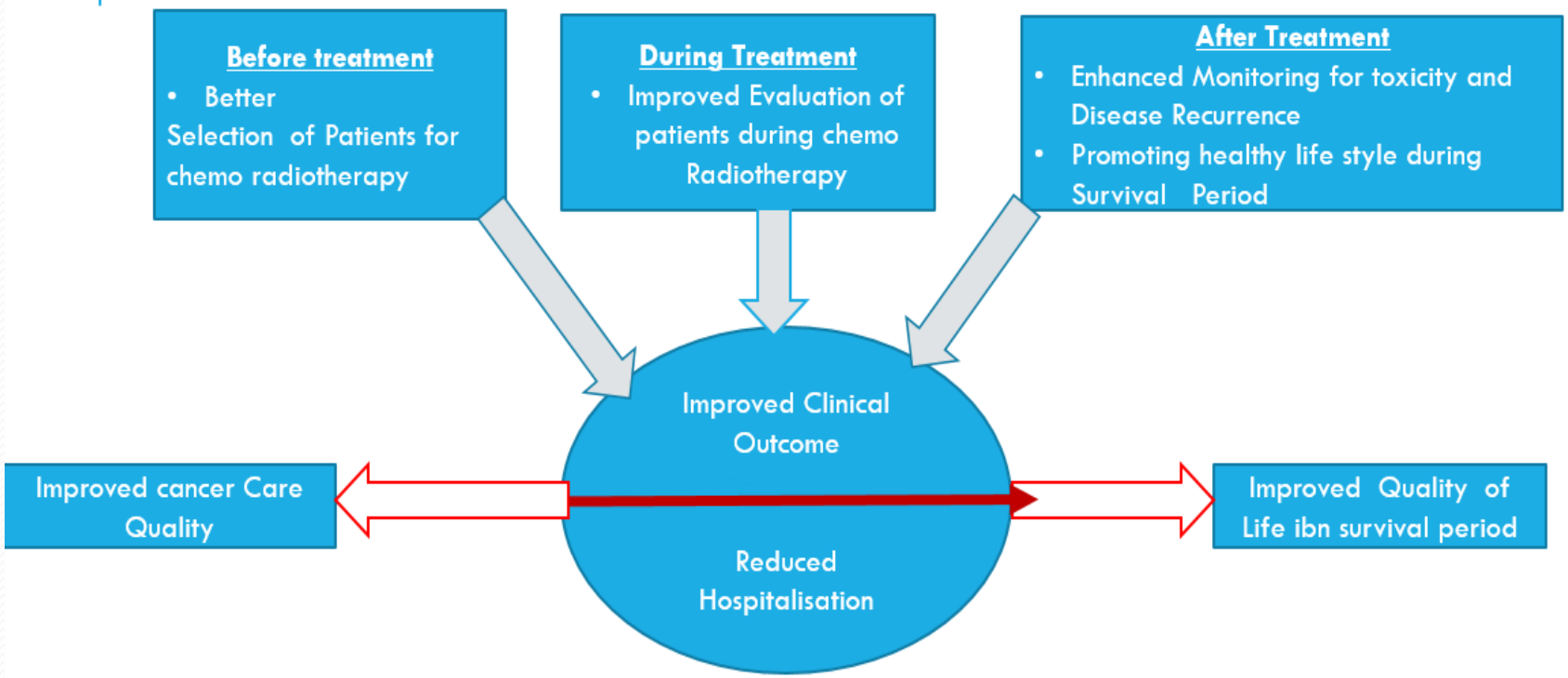
Wearable technology can be used for Tracking a student for continuous assessment

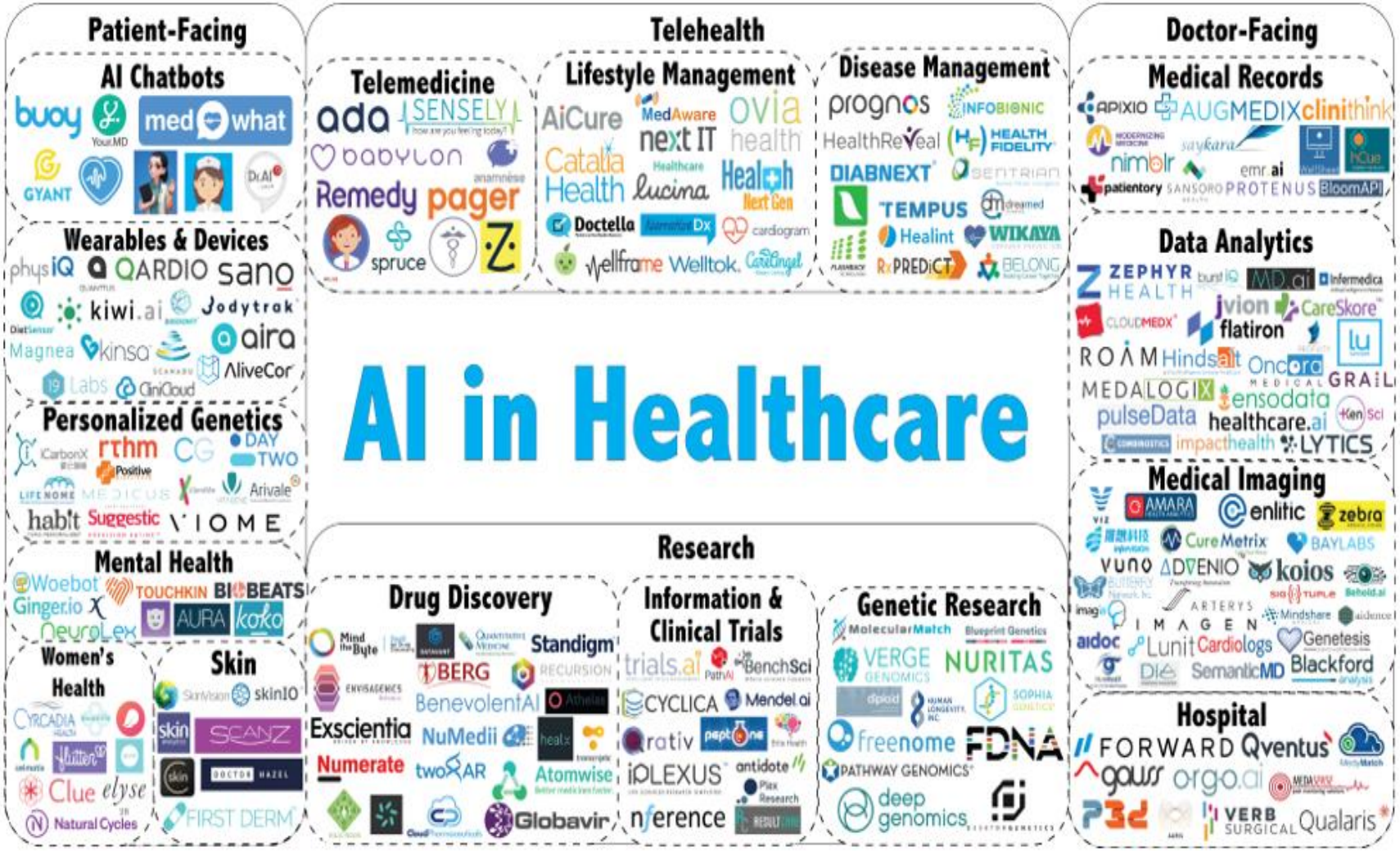
Wearable Applications and Markets



WEARABLE TECHNOLOGY IN ONCOLOGY

Cuffs
Wrist Worn
Breath omics
Clothing embedded
Patches




Patient-Facing
AI Chatbots
buoy
Your.MD
med what
GYANT
Dr.AI
Wearables & Devices
physiQ
QARDIO
sano
kiwi.ai
Jodytrak
Magnea
kinsa
aira
AliveCor
Labs
CliniCloud
Personalized Genetics
CarbonX
rthm
CG
DAY TWO
Positive
LIFENOME
MEDICUS
Arivale
habit
Suggestic
VIOME
Mental Health
Woebot
TOUCHKIN
BIOBEATS
Ginger.io
AURA
koko
NeuroLex
Women's Health
CYCRADIA
Clue
elyse
Natural Cycles
Skin
SkinVision
skinIO
skin
SCANZ
DOCTOR HAZEL
FIRST DERM
Telehealth
Telemedicine
ada
SENSELY
babylon
anamnése
Remedy
pager
spruce
Lifestyle Management
AiCure
MedAware
ovia
next IT
health
Catalia Health
Healthcare
lucina
Healoh
Next Gen
Doctella
cardiogram
wellframe
Welltok
CareAngel
Disease Management
prognos
INFOBIONIC
HealthReveal
HEALTH FIDELITY
DIABNEXT
SENTRIAN
TEMPUS
dreamed
Healint
WIKAYA
RxPREDICT
BELONG
AI in Healthcare
Research
Drug Discovery
Mind the Byte
Standigm
BERG
RECURSION
BenevolentAI
Exscientia
NuMedii
Numerate
twoXAR
Atomwise
Globavir
Information & Clinical Trials
trials.ai
PathAI
BenchSci
CYCLICA
Mendel.ai
nference
Genetic Research
MolecularMatch
Blueprint Genetics
VERGE GENOMICS
NURITAS
SOPHIA GENETICS
freenome
FDNA
PATHWAY GENOMICS
deep genomics
Doctor-Facing
Medical Records
APIXIO
AUGMEDIX
clinithink
saykara
nimblr
emr.ai
patientory
SANSORO
PROTENUS
BloomAPI
Data Analytics
ZEPHYR HEALTH
MD.ai
Infermedica
jvion
CareSkore
CLOUDMEDX
flatiron
ROAM
Hindsalt
Oncora
GRAIL
MEDALOGIX
ensodata
pulseData
healthcare.ai
impacthealth
LYTICS
Medical Imaging
AMARA
enlitic
zebra
CureMetrix
BAYLABS
VUNO
ADVENIO
koios
ARTERYS
IMAGEN
Lunit
Cardiologs
Genetesis
aidoc
SemanticMD
Blackford
Hospital
FORWARD
Qventus
gauss
orgo.ai
P3d
VERB SURGICAL
Qualaris

BIG DATA IN HEALTHCARE



- First time in history extremely Big Data is available
- The Big Data cannot be used by individual physician
- Big Data itself is meaningless, but processing it offers the prom… unlocking novel insights and accelerating breakthroughs in mec… … turn has the potential to transform current clinical practice
- Explosion in knowledge is beyond use for any capacity
- It would be criminal not use latest processed data/protocol in management of patients
- Artificial Intelligence (AI) in the era of Big Data could assist physicians in shortening processing times and improving the quality of patient care in clinical practice

BJMC First Digital collaboration

World Gastroenterology Organisation

Global Guardian of Digestive Health. Serving the World.

- BJMC was a representative of India for International digital Epidemiological Study on "Acute Pain in Abdomen".
- World Congress of Gastroenterology (OMGE)
- Project Director Dr. Ohmann, of University of Düsseldorf, Germany.



MEDIZINISCHE EINRICHTUNGEN
Chirurgische Klinik und Poliklinik
Klinik für Allgemeine und Unfallchirurgie • Direktor: Universitätsprofessor Dr. H.-D. Röher

Funktionsbereich Theoretische Chirurgie, Moorenstraße 5, D-40225 Düsseldorf

Funktionsbereich Theoretische Chirurgie
Leiter: Prof. Dr. C. Ohmann

Dr. A.V. Jamkar
Professor of Surgery
BJ Medical College
Sassoon General Hospital
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India

Tel. Sekretariat: (0211) 81 - 16142
Tel. Leiter: (0211) 81 -17403
Tel. EDV: (0211) 81 - 16149
Fax: (0211) 31 69 78
Compuserve: 100317,2360

Auskunft erteilt: Prof. Dr. Ohmann

Datum und Zeichen Ihres Schreibens | Mein Zeichen: Prof. Dr. Oh/Si. | Datum: August 25, 1997

Dear Prof. Jamkar,

we would like to invite you to collaborate in our worldwide data collection in a study in Acute Abdominal Pain.

This data collection is performed via Internet and WWW, which requires a PC connected to the Internet on your side, together with a Netscape Navigator 3 web browser. A modem connection of 28K or better is recommended (though not absolutely necessary).

The study is part of an OMGE project for quality assurance in the treatment of acute abdominal pain and performed by our unit sited at the Heinrich-Heine-University in Düsseldorf.

Prof. Dr. Ohmann

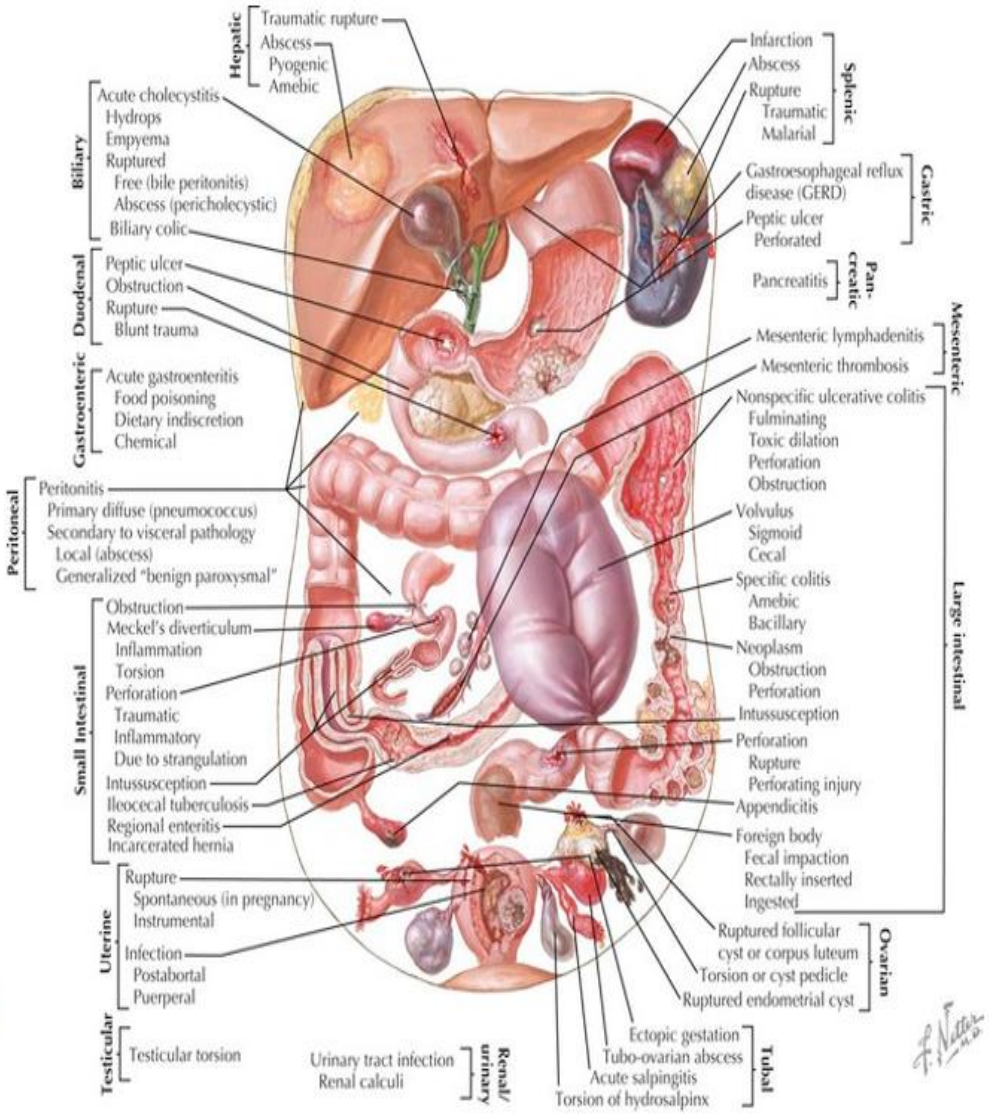
Dr. Parag Sahasrabuddhe	Computerised Database Analysis of Acute Abdominal Emergencies to Improve Diagnosis and Management of Patients	Dec 1993
Dr. Swati Zagde	Computerised Database Analysis of Cases of Acute Abdomen with Perforative Peritonitis	Dec 1995
DrAbhijit Karve	Computerised Database Analysis of Cases of Acute appendicitis	Dec 1996
Dr. Ashish Rawandale	Computer Aided Decision Making in Acute Abdomen	Dec 1997

Dr Ashish Patil

Surgeon Dhule

Evaluation of Computer assisted Medical Decision Making software in management of Acute abdomen.

Medical Journal of Western India. 28: 45-49. 2000



डॉ. आशिष पाटील यांची पेटंटची हॅट्ट्रिक!

देशातील एकमेव संशोधक डॉक्टर; 'यू-पास'चे संशोधन



आशिष पाटील

धुळे, ता. ४ : देशातील प्रतिथयश युरोलॉजिस्ट डॉ. आशिष पाटील यांनी ऐतिहासिक कामगिरी करत पेटंटची हॅट्ट्रिक साधली आहे. डॉ. पाटील यांच्या संशोधित 'यू- पास'ला नुकतेच पेटंट प्राप्त झाले आहे. या यशप्राप्तीनंतर स्वतःचाच विक्रम मोडीत डॉ. पाटील आता तीन पेटंट मिळविणारे देशातील एकमेव डॉक्टर ठरले आहेत. कार्यकर्तृत्वामुळे त्यांची पूर्वीच दोन वेळा 'गीनिज बुक

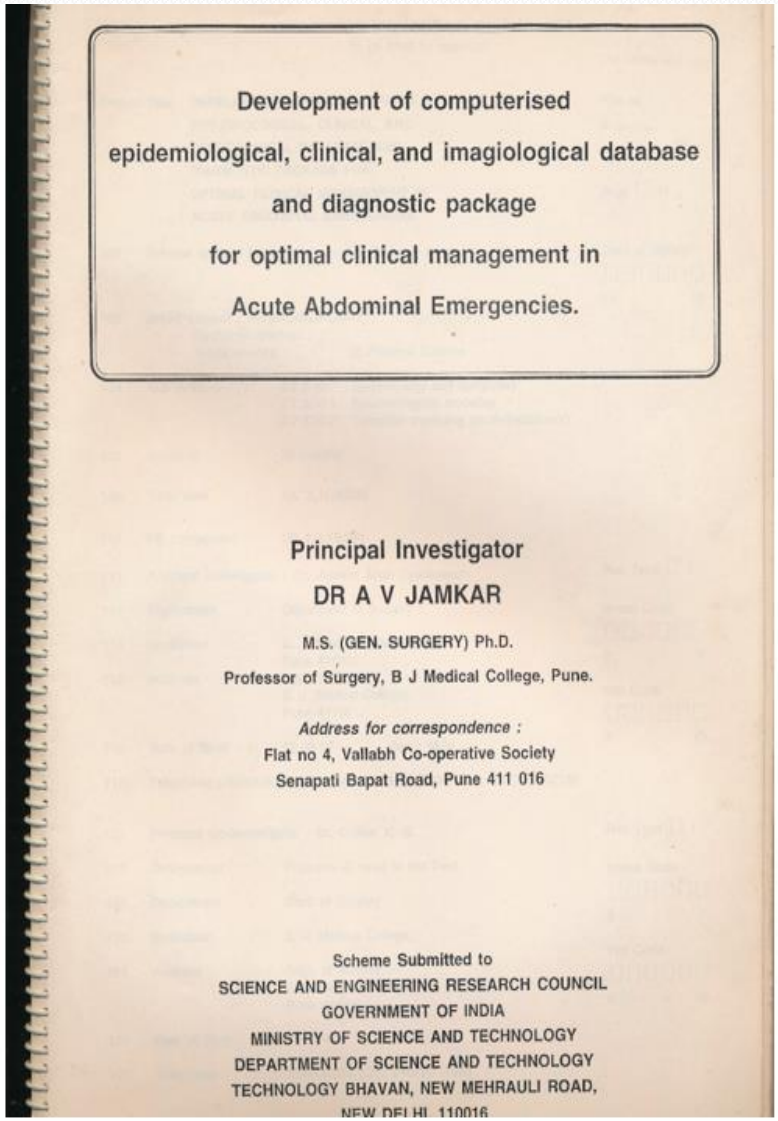
पोकळ अवयवांच्या शस्त्रक्रियेसाठी 'युनिव्हर्सल पर्क्युटिनिअस ॲक्सेस सिस्टिम' (यू- पास) संशोधित केली आहे. मानवी शरीरात घन आणि पोकळ, असे दोन प्रकारचे अवयव असतात. घन अवयवांत यकृत, प्लिहा, मूत्रपिंड, मूत्रपिंडावरील ग्रंथी, स्वादुपिंड, अंडाशय, गर्भाशय; तर पोकळ अवयवात पोट, लहान आणि मोठे आतडे, पित्ताशय, पित्ततलिका, अंड नलिका, मूत्रनलिका, मूत्राशय आदींचा समावेश असतो.

'यू- पास'चा उपयोग

'पर्क्युटेनियस नेफ्रोलिथोटॉमी' (पीसीएनएल) ही जागतिकस्तरावर



"पेटंटची हॅट्ट्रिक वैद्यकशास्त्रात अज्ञात आहे. तीन पेटंट मिळविणे हे देशासाठी अभिमानाची, तर आमच्यासाठी समाधानाची बाब आहे. शस्त्रक्रियेचा खर्च, गुंतागुंत कमी करून रुग्णाला लवकर बरे करणे, हा या संशोधनाचा मूळ उद्देश आहे. जागतिक पातळीवर भारताचे प्रतिनिधित्व करताना विशेष आनंद हो आहे.



Development of computerised
epidemiological, clinical, and imagiological database
and diagnostic package
for optimal clinical management in
Acute Abdominal Emergencies.

Principal Investigator
DR A V JAMKAR
M.S. (GEN. SURGERY) Ph.D.
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Scheme Submitted to
SCIENCE AND ENGINEERING RESEARCH COUNCIL
GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
TECHNOLOGY BHAVAN, NEW MEHRAULI ROAD,
NEW DELHI 110016

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EPIDEMIOLOGY OF MEDICAL ERROR

BMJ 2000; 320 DOI: HTTPS://DOI.ORG/10.1136/BMJ.320.7237.774

- The Harvard and Australian studies into medical error remain the only studies that provide population level data on the rates of injuries to patients in hospitals and they identified a substantial amount of medical error
- In the United States, medical error results in 44,000 – 98,000 unnecessary deaths each year and 1,000,000 excess injuries
- The Harvard study of medical practice, Brennan et al. reviewed the medical charts of 30,121 patients admitted to 51 acute care hospitals in New York state in 1984
- They reported that adverse events – Injuries caused by medical management that prolonged admission or produced disability at the time of discharge – occurred in 3.7% of admissions
- A subsequent analysis of the same data **"69% of injuries were caused by errors"**

Epidemiology of Medical Error 2

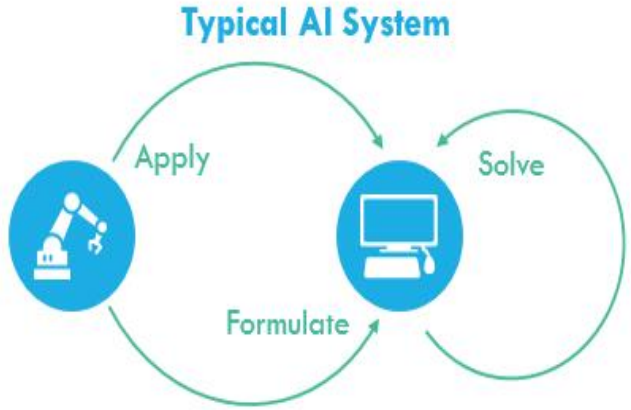
- The quality of Australian health care, a population based study modelled on the Harvard study, investigators reviewed the medical records of 14,179 admissions to 28 hospitals in New South Wales and South Australia in 1995

- An adverse event occurred in 16.6% of admissions, resulting in permanent disability in 13.7% of patients and death in 4.9%; 51% of adverse events were considered to have been preventable

Errors often occur when clinicians are inexperienced and new procedures are introduced.
Extremes of age, complex care, urgent care, and a prolonged hospital stay are associated with more errors.

WHAT IS AI AND ML?

Computers making decisions in real-world problems





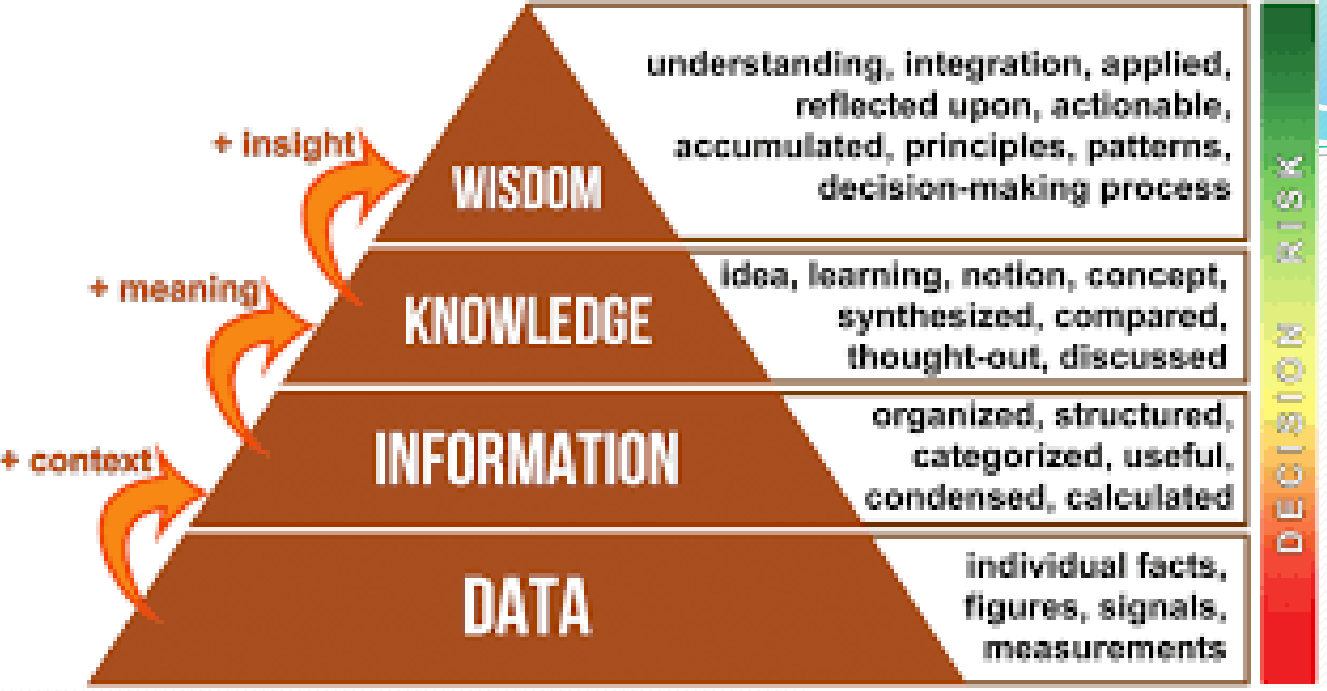


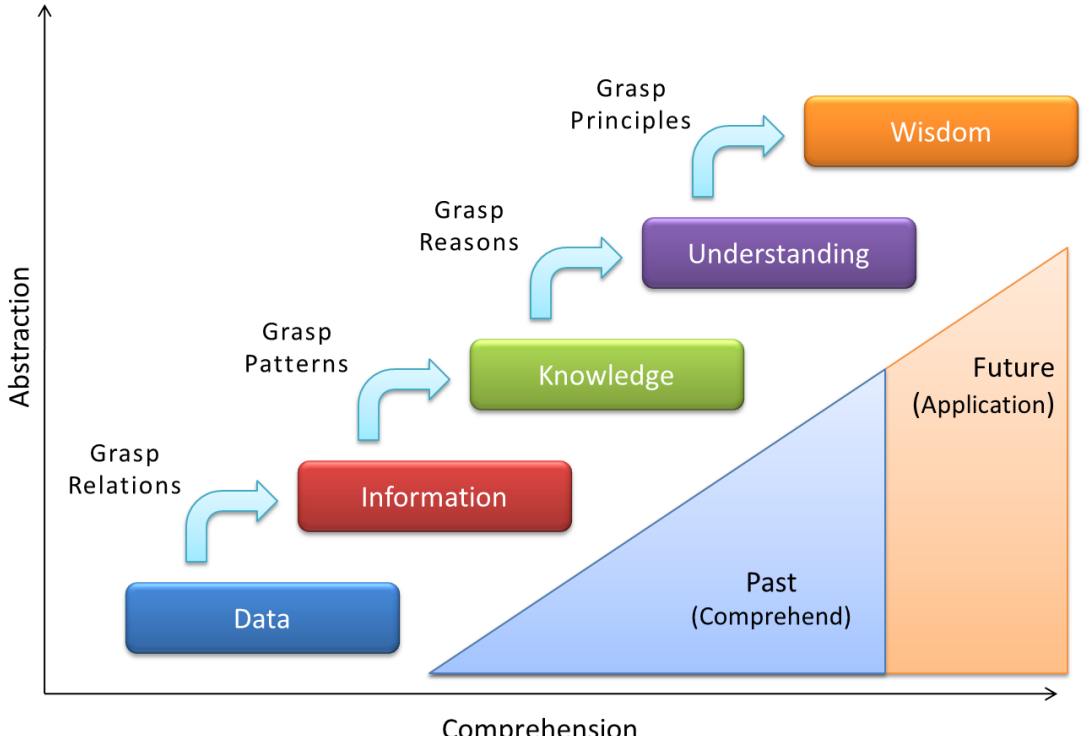
Artificial Intelligence (AI)
As Defined By John Mccarthy In 1955

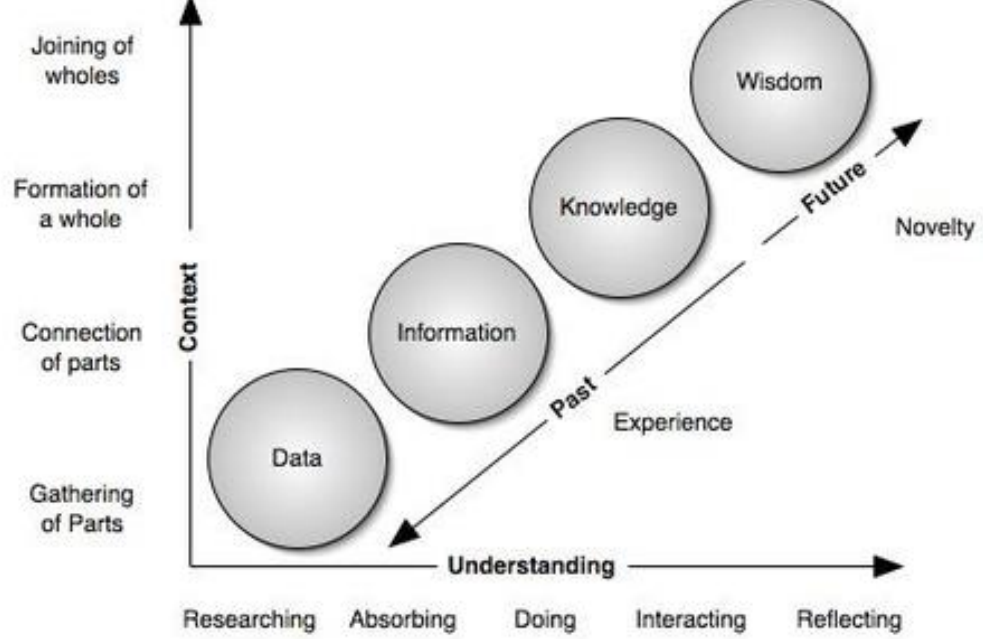
The term AI, is defined as a machine with intelligent behaviour such as perception, reasoning, learning, or communication and the ability to perform human tasks

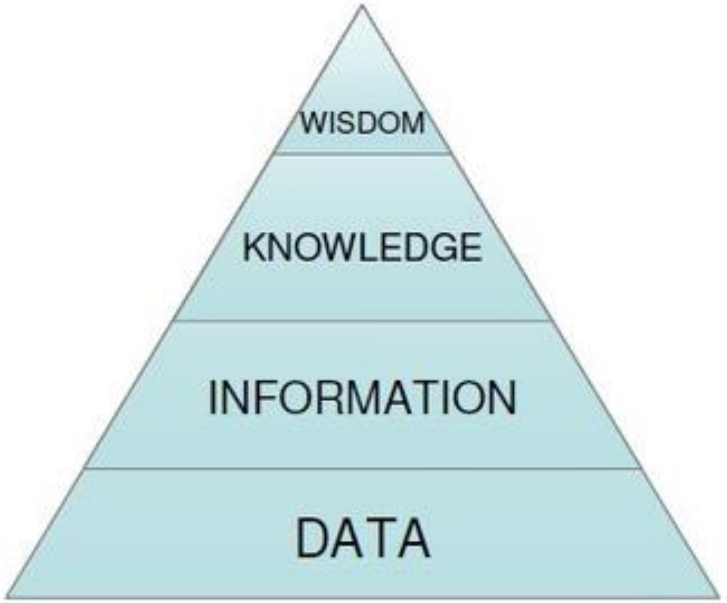


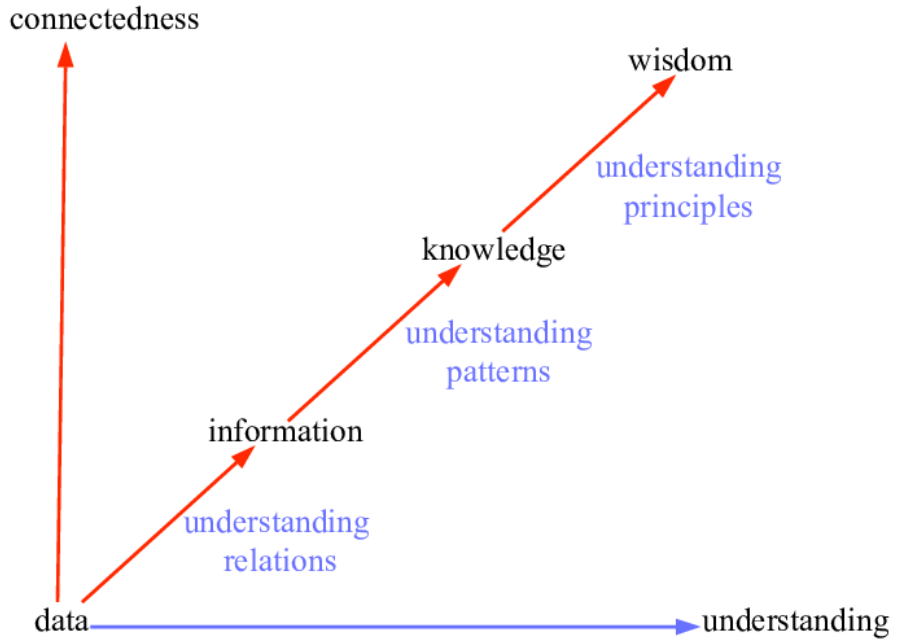
- **Artificial wisdom** is a software system that can demonstrate one or more qualities of being wise.
- **Artificial wisdom** can be described as **artificial** intelligence reaching the top-level of decision-making when confronted with the most complex challenging situations.

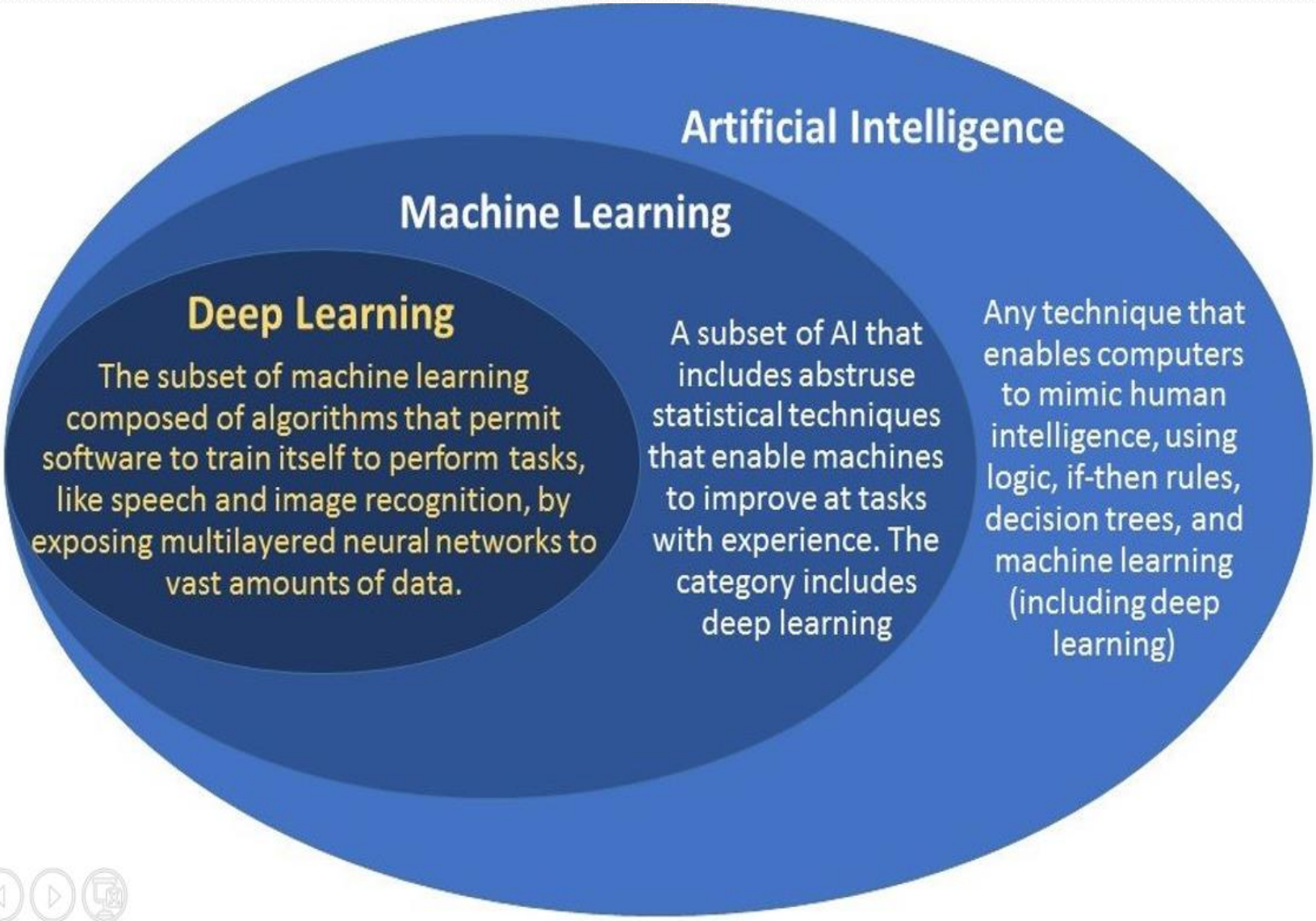

+ insight
+ meaning
+ context
WISDOM
KNOWLEDGE
INFORMATION
DATA
understanding, integration, applied, reflected upon, actionable, accumulated, principles, patterns, decision-making process
idea, learning, notion, concept, synthesized, compared, thought-out, discussed
organized, structured, categorized, useful, condensed, calculated
individual facts, figures, signals, measurements
DECISION RISK

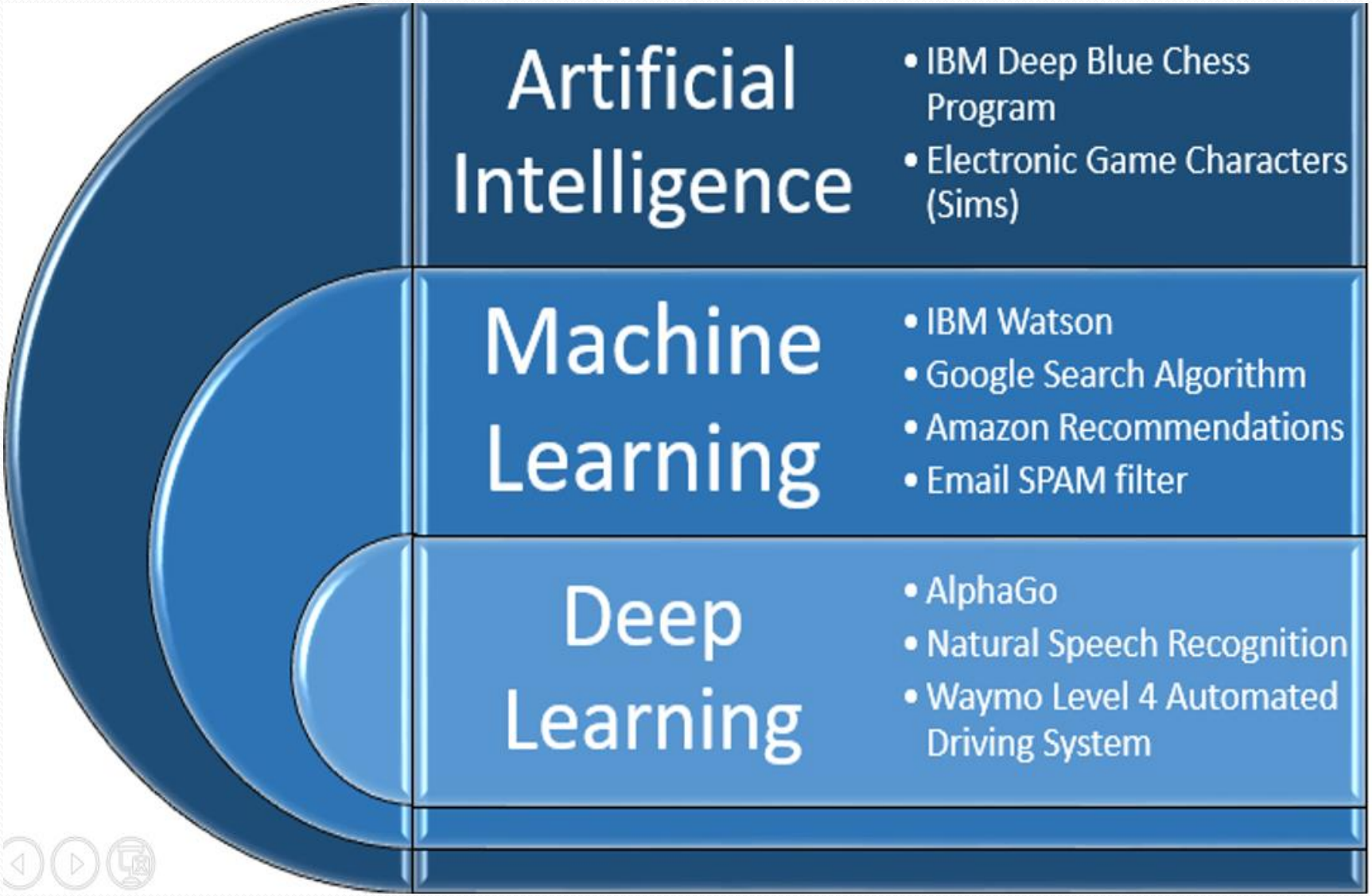

Grasp Principles
Wisdom
Grasp Reasons
Understanding
Grasp Patterns
Knowledge
Grasp Relations
Information
Data
Abstraction
Future (Application)
Past (Comprehend)
Comprehension


Joining of wholes
Formation of a whole
Connection of parts
Gathering of Parts
Context
Wisdom
Knowledge
Information
Data
Future
Novelty
Past
Experience
Understanding
Researching
Absorbing
Doing
Interacting
Reflecting


WISDOM
KNOWLEDGE
INFORMATION
DATA

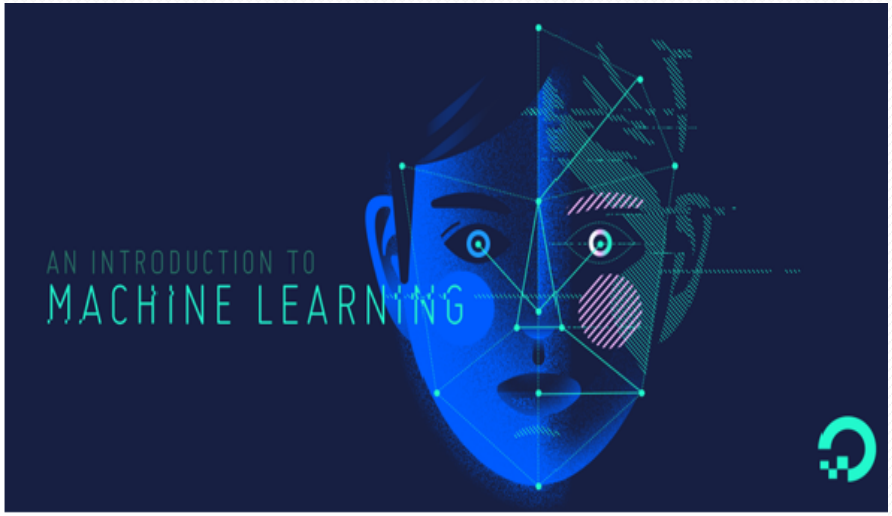

connectedness
wisdom
understanding
principles
knowledge
understanding
patterns
information
understanding
relations
data
understanding

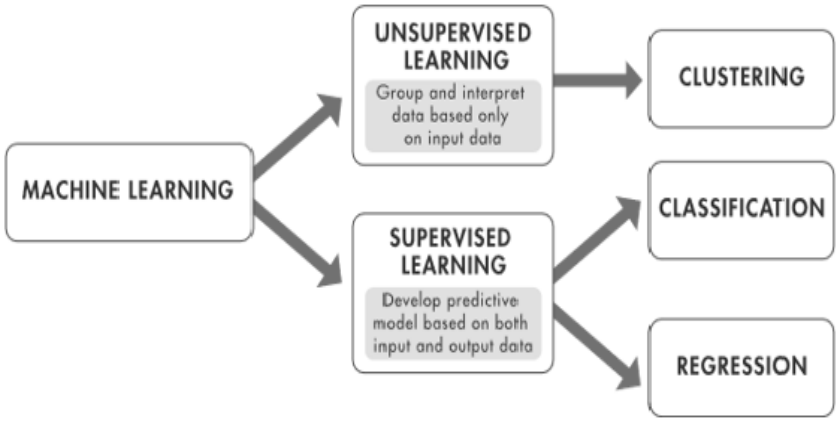

Artificial Intelligence
Any technique that enables computers to mimic human intelligence, using logic, if-then rules, decision trees, and machine learning (including deep learning)
Machine Learning
A subset of AI that includes abstruse statistical techniques that enable machines to improve at tasks with experience. The category includes deep learning
Deep Learning
The subset of machine learning composed of algorithms that permit software to train itself to perform tasks, like speech and image recognition, by exposing multilayered neural networks to vast amounts of data.


Artificial Intelligence
• IBM Deep Blue Chess Program
• Electronic Game Characters (Sims)
Machine Learning
• IBM Watson
• Google Search Algorithm
• Amazon Recommendations
• Email SPAM filter
Deep Learning
• AlphaGo
• Natural Speech Recognition
• Waymo Level 4 Automated Driving System

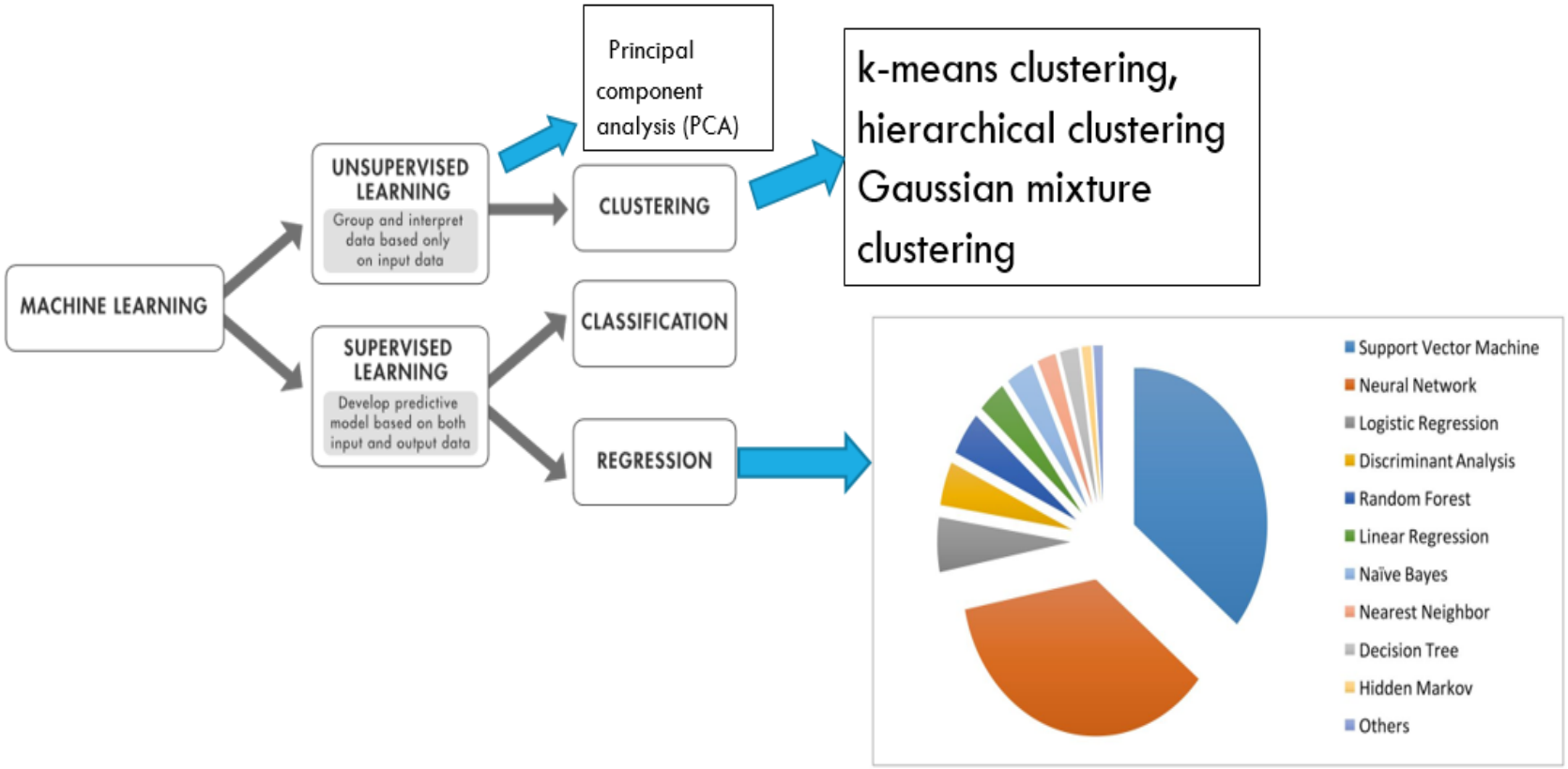
Machine learning is an application of artificial **intelligence** (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.

Machine learning focuses on the development of computer programs that can access data and use it learn for themselves.





THE MACHINE LEARNING ALGORITHMS USED IN THE MEDICAL LITERATURE

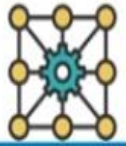


Why do we need Deep Learning?



Works with unstructured data

Machine Learning works only with large sets of structured data, while Deep Learning can work with both structured and unstructured data



Handle complex operations

Deep Learning algorithms can perform complex operations easily while Machine Learning Algorithms cannot



Feature Extraction

Machine Learning algorithms use labelled sample data to extract patterns, while Deep Learning accepts large volumes of data as input, analyze the input to extract features out of an object



Achieve best performance

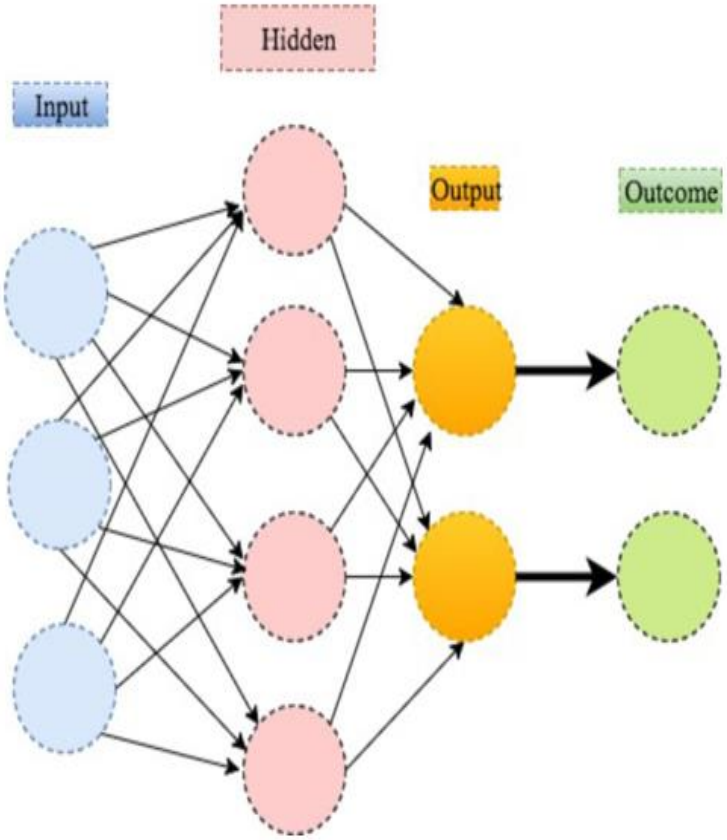
Performance of Machine Learning algorithms decreases as the amount of data increase, so to maintain the performance of the model we need Deep Learning

Table 1 Main Machine-Learning Strategies: Their Characteristics, Scope, and Limitations

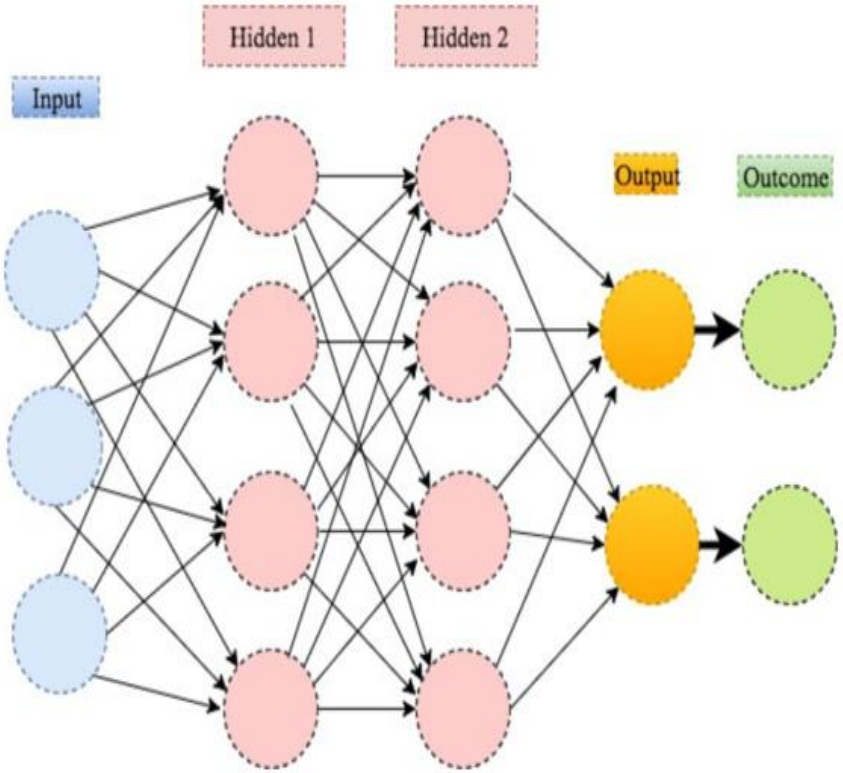
ML types	Algorithms Description	Characteristics	Limitation
Supervised Learning	Labeled data set System trained with human feedback	Applications include classification, regression, and prediction; ideal for modeling disease prognosis or treatment outcome. Modeling algorithms include Artificial Neural Network (ANN), Support Vector Machine (SVM), Random Forest (RF)	Requires a large amount of labeled data for training; need validation in an independent cohort.
Unsupervised Learning	Non-labeled data by humans	Applications include mainly pattern recognition; ideal for modeling disease mechanisms, identifying hidden patterns in genotype or phenotype data. Modeling algorithms include various clustering methods	Needs validation in several independent cohorts
Reinforcement Learning	Hybrid approach; the goal is to maximize accuracy by trial and error; especially useful in a complex environment	Applications include chemistry, robotics, games, resource management in computer clusters, personalized recommendations	Memory intensive

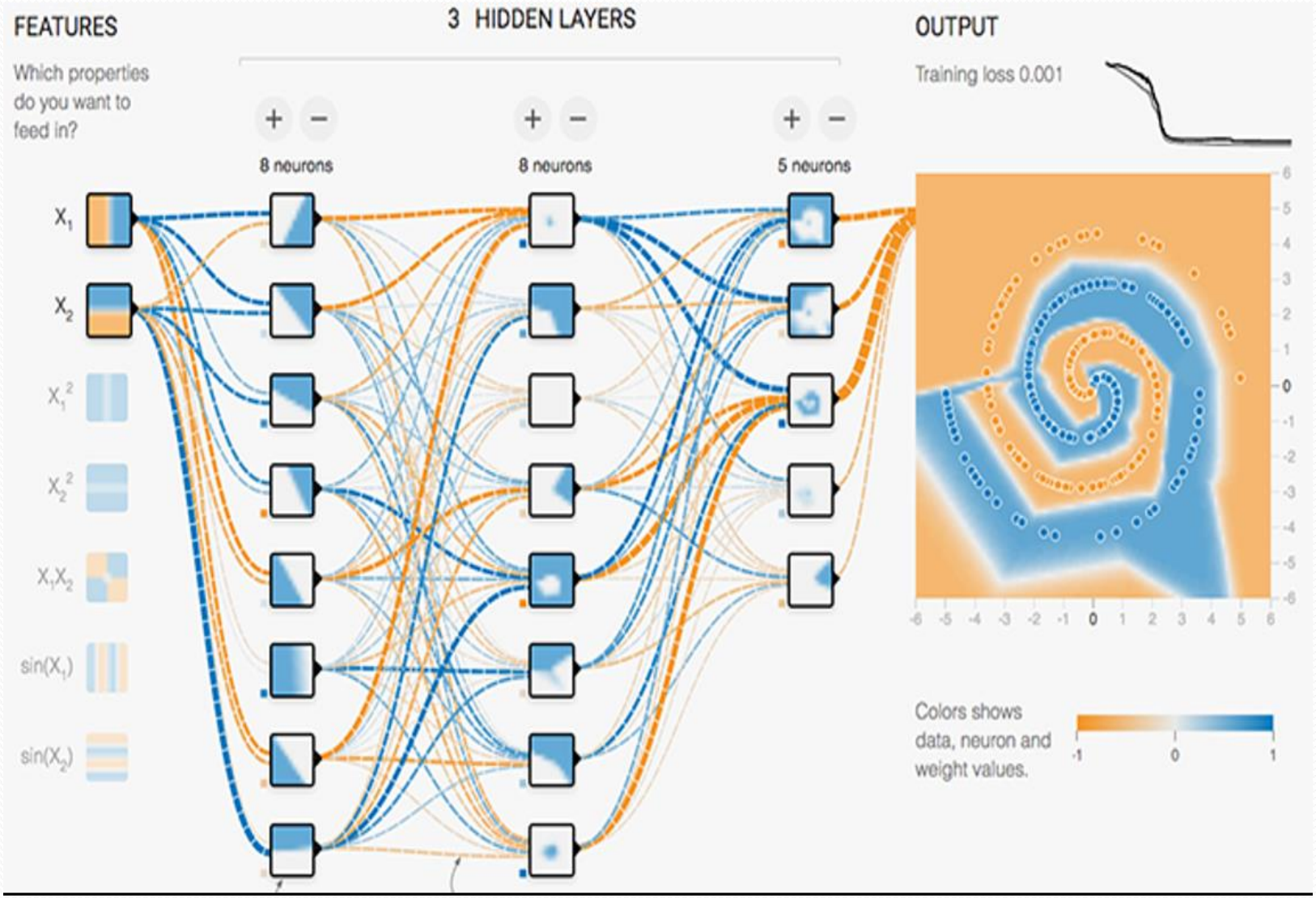
ML = machine learning.

- An illustration of neural network.



- An illustration of deep learning with two hidden layers




FEATURES
Which properties do you want to feed in?
3 HIDDEN LAYERS
8 neurons
8 neurons
5 neurons
X_1
X_2
X_1^2
X_2^2
X_1X_2
$\sin(X_1)$
$\sin(X_2)$
OUTPUT
Training loss 0.001
Colors shows data, neuron and weight values.
-1
0
1

AI | ML | DL AUGMENTS HUMAN DECISION-MAKING IN HEALTHCARE

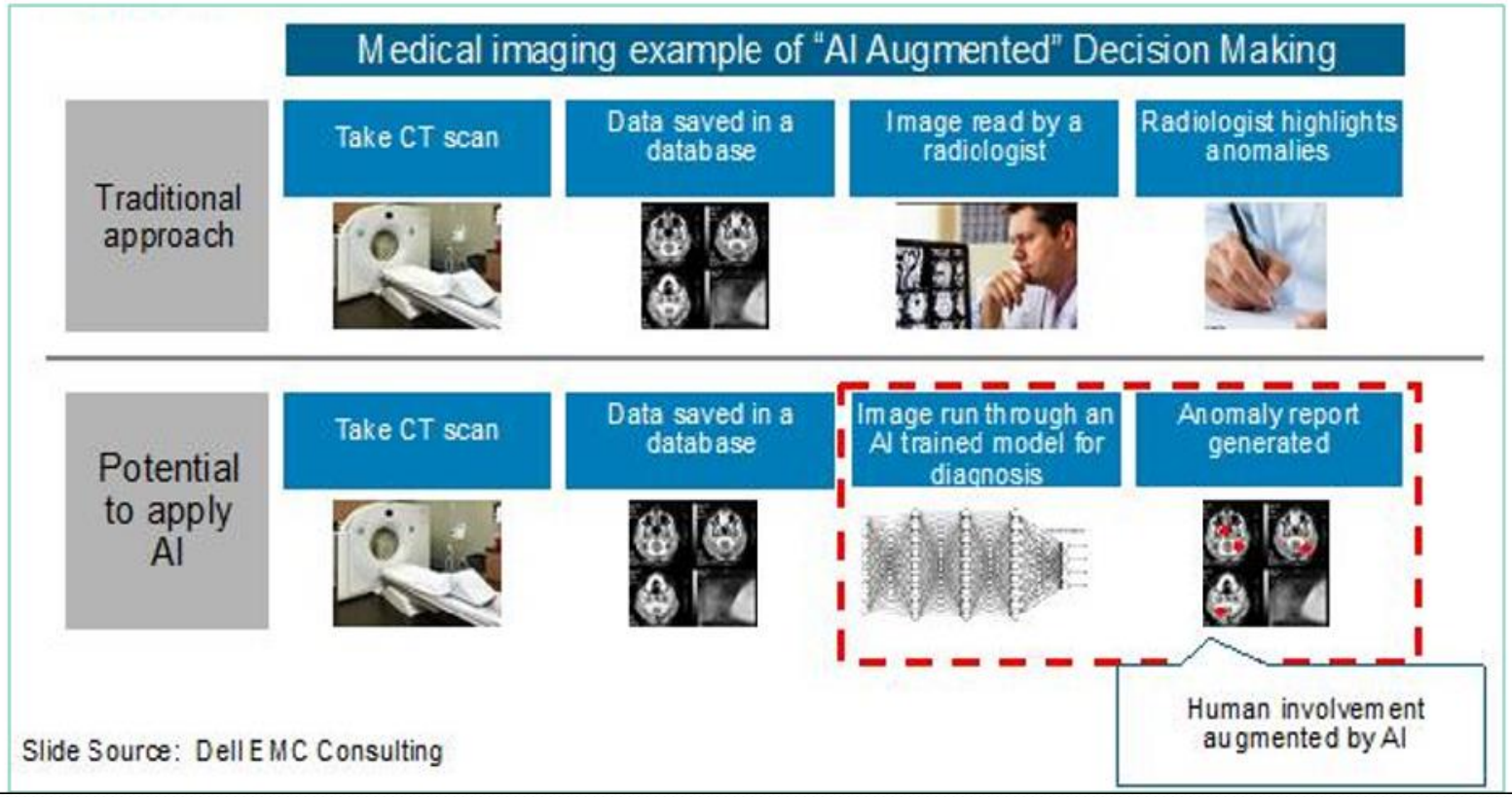
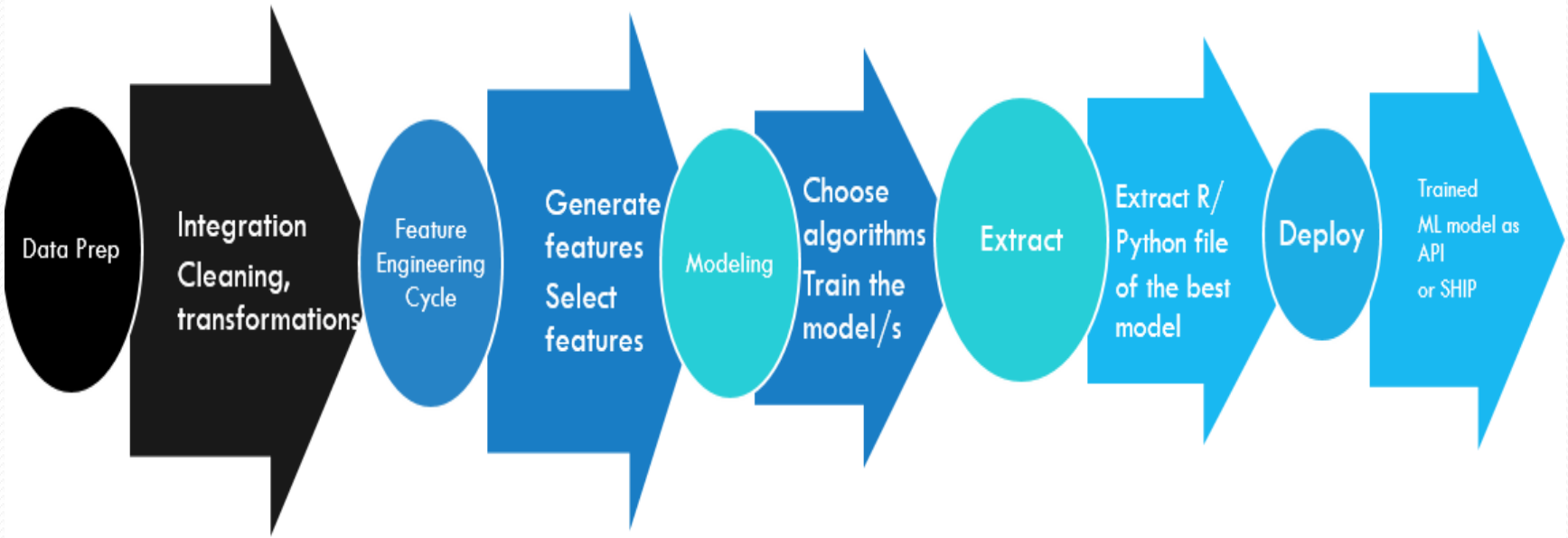


IMAGE HANDLING PROCESS

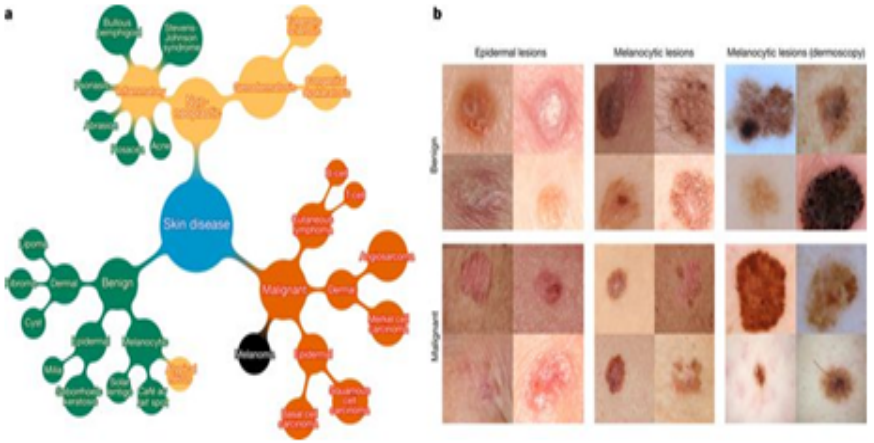


Artificial Intelligence Systems In Medicine

- AIS systems in skin diseases
- AI system in Diabetic retinopathy
- AI systems in Radiology
- AI systems in Gastro endoscopy
- AI system in Coronary angiography
- AI systems in Primary health care
- AI systems in Intensive care unit
- AI systems in Microbiology
- AI systems in epidemiology
- AI systems in Drug discovery
- AI systems in Anesthesiology

Dermatologist-level Classification Of Skin Cancer With Deep Neural Networks: Nature Article

- Andre Esteva[1 n1], Brett Kuprel[1 n1], Roberto A. Novoa[2,3], Justin Ko[2]
- Deep convolutional Neural Networks (CNNs)[4,5] show potential for general and highly variable tasks across many fine-grained object categories
- Classification of skin lesions using a single CNN, trained end-to-end from images directly, using only pixels and disease labels as inputs
- We train a CNN using a dataset of 129,450 clinical images – two orders of magnitude larger than previous datasets consisting of 2,032 different diseases

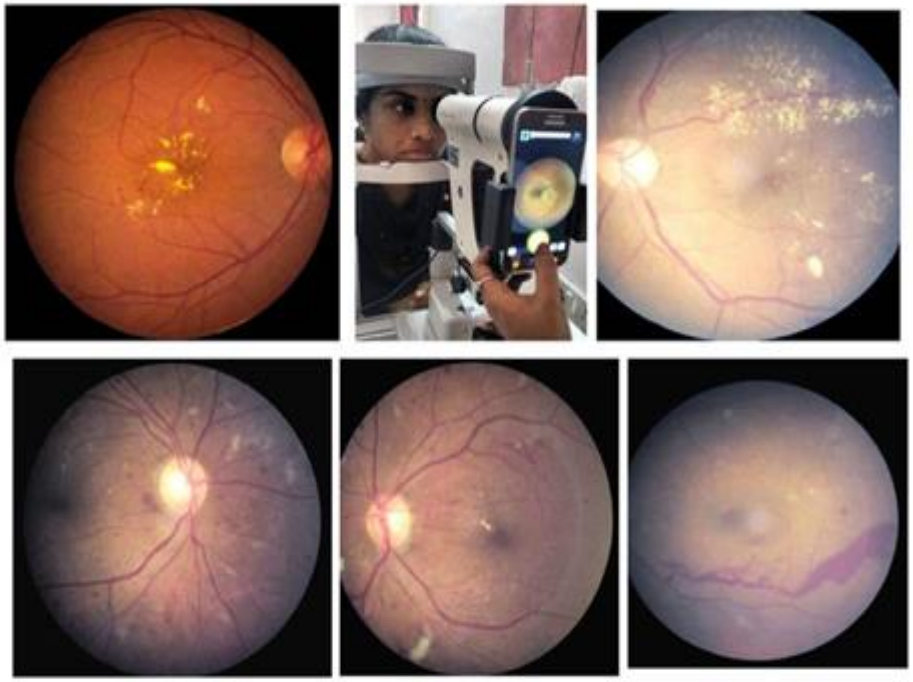


- We test its performance against 21 board-certified dermatologists on biopsy-proven clinical images with two critical binary classification use cases: keratinocyte carcinomas versus benign seborrheic keratoses; and malignant melanomas versus benign nevi

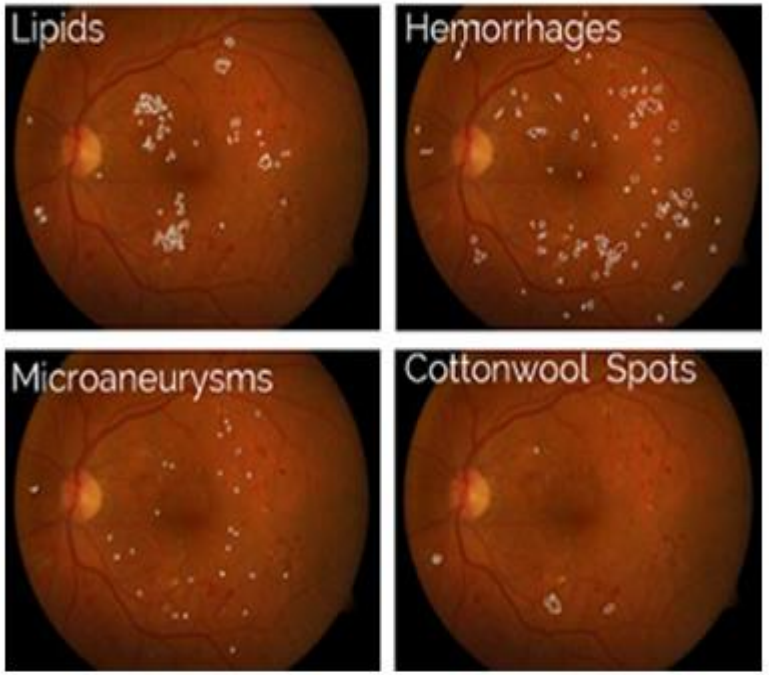
ARTIFICIAL INTELLIGENCE SYSTEMS IN MEDICINE

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- AI systems in Intensive care unit
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- AI systems in epidemiology
- AI systems in Drug discovery
- AI systems in Anesthesiology

EYENUK INC.'S AI-BASED DIABETIC RETINOPATHY SCREENING SOFTWARE EYEART™ TESTED WITH PORTABLE SMARTPHONE-BASED IMAGING DEVICE IN NEW STUDY INDICATING POTENTIAL FOR HIGHLY SENSITIVE YET COST-EFFECTIVE MASS RETINAL SCREENING



Automated Lesion Detection and Localization



ARTIFICIAL INTELLIGENCE SYSTEMS IN MEDICINE

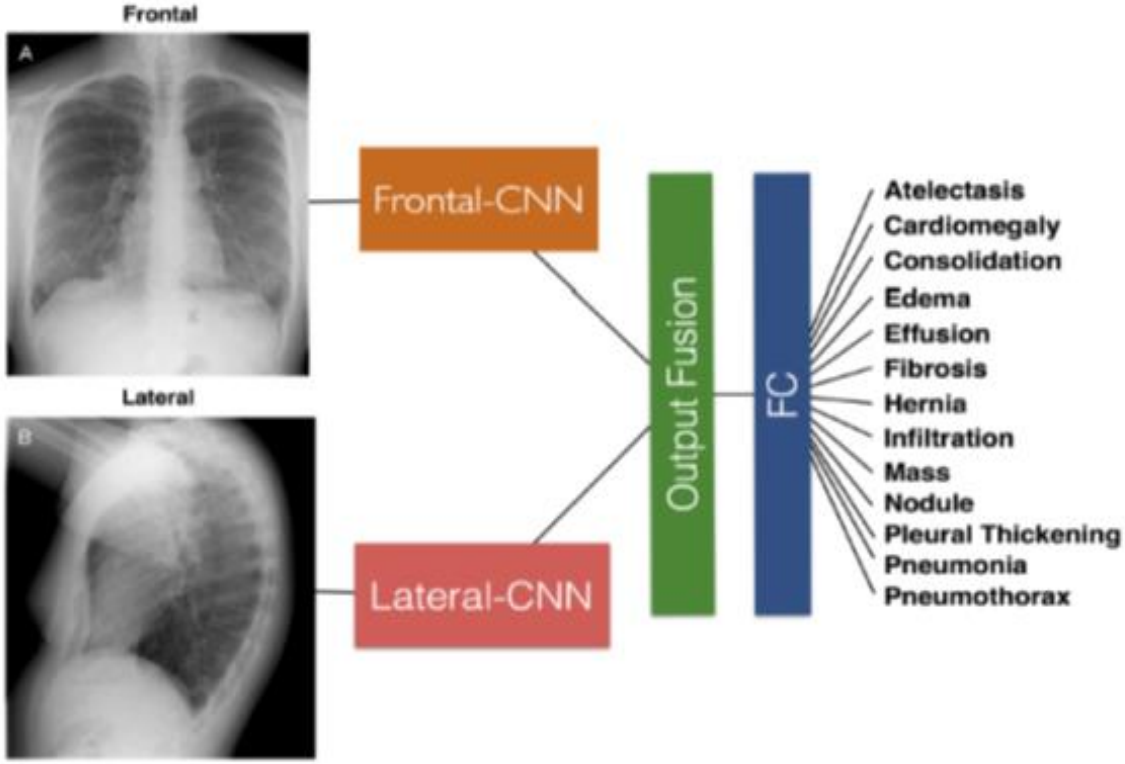
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- AI systems in Primary health care
- AI systems in Intensive care unit
- AI systems in Microbiology
- AI systems in epidemiology
- AI systems in Drug discovery
- AI systems in Hepatic resection

Computer Aided Diagnoses In Radiology Imaging

- Detection of lung nodules on PA and lateral chest radiographs
- Detection of vertebral fractures on lateral chest radiograph
- Detection of intracranial aneurysms in MRA
- Detection of interval changes in successive whole-body bone scans

LARGE SCALE AUTOMATED READING OF FRONTAL AND LATERAL CHEST X-RAYS USING DUAL CONVOLUTIONAL NEURAL NETWORKS-1

- Authors: Jonathan Rubin, Deepan Sanghavi, Claire Zhao, Kathy Lee, Asheaul Qadir, Minnan Xu-Wilson

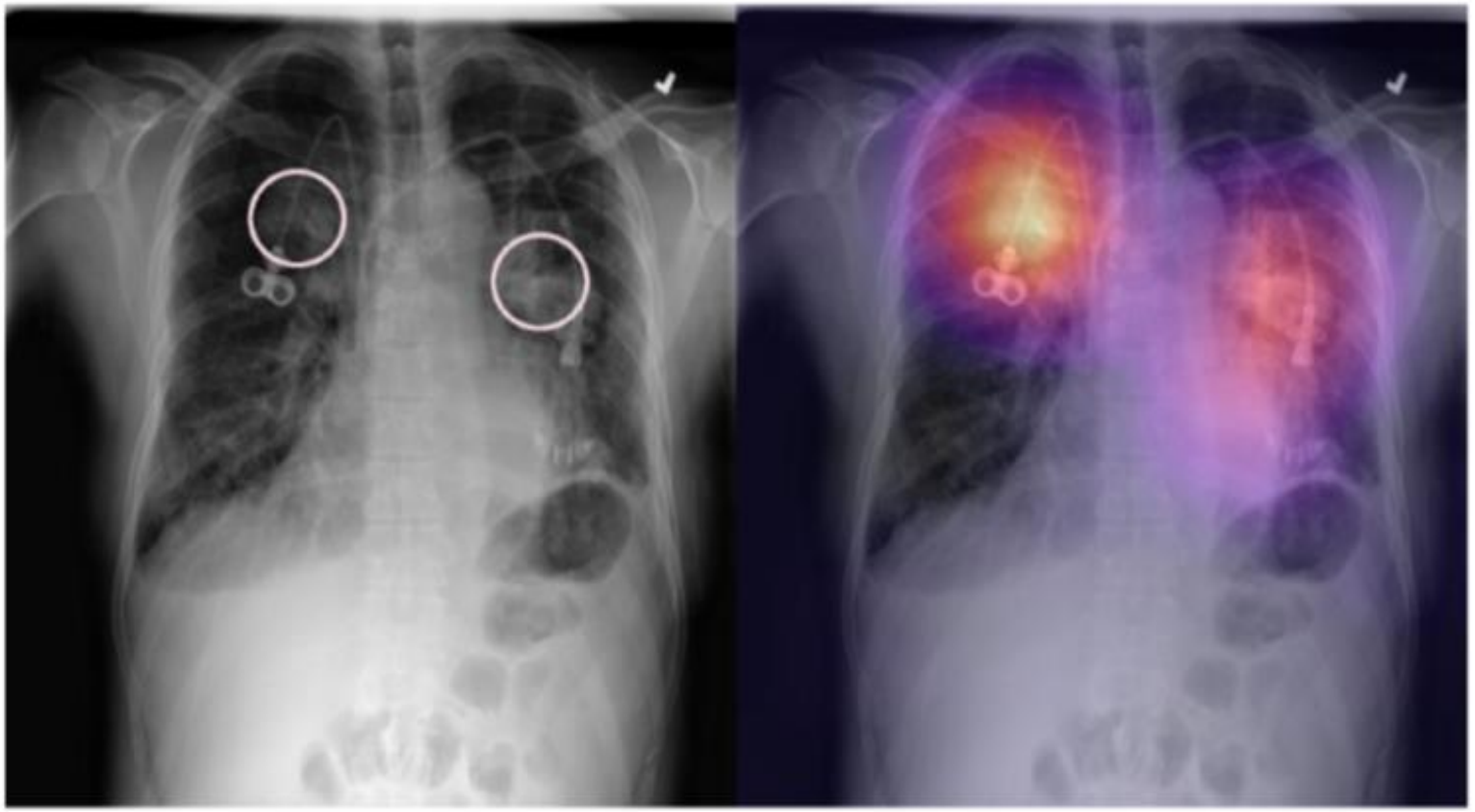


LARGE SCALE AUTOMATED READING OF FRONTAL AND LATERAL CHEST X-RAYS USING DUAL CONVOLUTIONAL NEURAL NETWORKS-2

Finding	Individual PA+Lateral	DualNet PA+Lateral	Individual AP+Lateral	DualNet AP+Lateral
Atelectasis	0.760	**0.766**	**0.675**	0.671
Cardiomegaly	**0.835**	0.840	0.752	**0.755**
Consolidation	**0.642**	0.632	**0.625**	0.623
Edema	0.723	**0.734**	**0.757**	0.749
Effusion	0.735	**0.757**	0.701	**0.733**
Fibrosis	0.638	**0.761**	0.552	**0.610**
Hernia	0.716	**0.815**	0.701	**0.758**
Infiltration	0.746	**0.748**	0.590	**0.773**
Mass	0.656	**0.692**	0.574	**0.581**
No Finding	0.746	**0.758**	0.727	**0.734**
Nodule	0.527	**0.568**	**0.549**	0.527
Pleural Thickening	0.687	**0.687**	0.571	**0.629**
Pneumonia	0.596	**0.625**	0.571	**0.593**
Pneumothorax	0.659	**0.706**	0.577	**0.621**
Average	0.690	**0.721**	0.637	**0.668**

DEEP LEARNING FOR CHEST RADIOGRAPH DIAGNOSIS: A RETROSPECTIVE COMPARISON OF THE CHEXNEXT ALGORITHM TO PRACTICING RADIOLOGISTS-1

- Authors: **Pranav Rajpurkar, Jeremy Irvin, Robyn L. Ball**



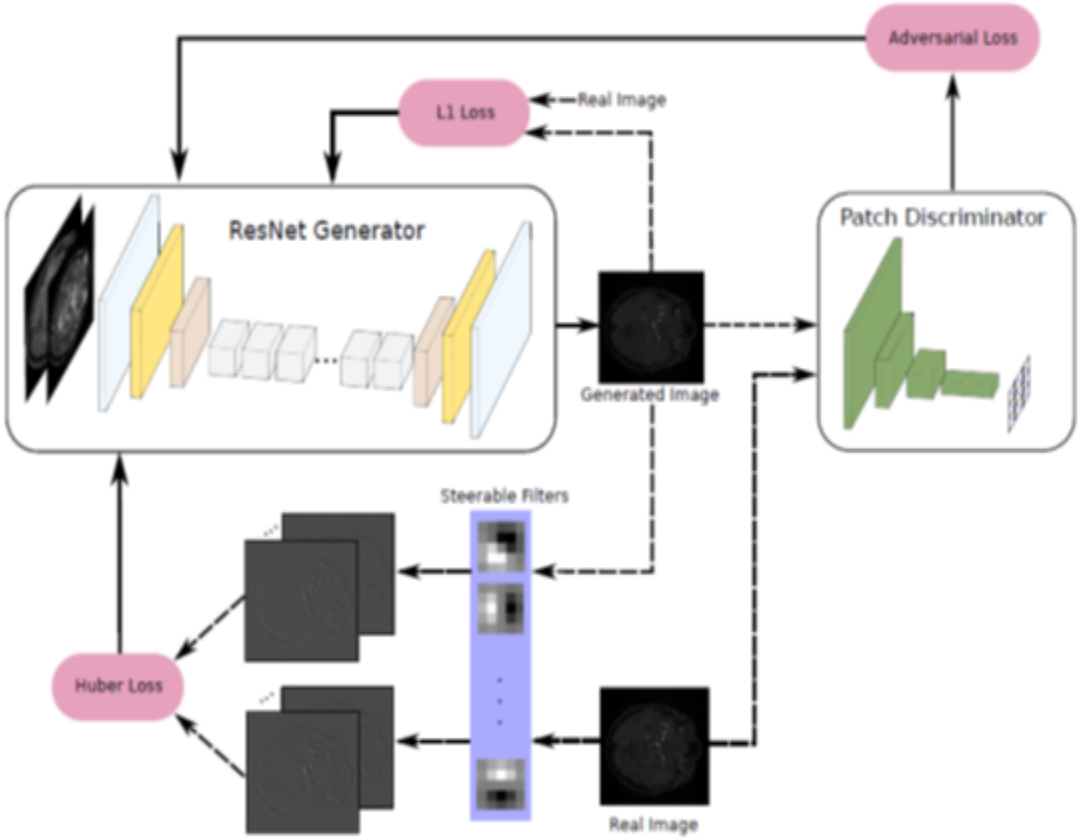
DEEP LEARNING FOR CHEST RADIOGRAPH DIAGNOSIS: A RETROSPECTIVE COMPARISON OF THE CHEXNEXT ALGORITHM TO PRACTICING RADIOLOGISTS-3

Table 1. Radiologists and algorithm AUC with CIs.

Pathology	Radiologists (95% CI)	Algorithm (95% CI)	Algorithm – Radiologists Difference (99.6% CI)[a]	Advantage
Atelectasis	0.808 (0.777 to 0.838)	0.862 (0.825 to 0.895)	0.053 (0.003 to 0.101)	Algorithm
Cardiomegaly	0.888 (0.863 to 0.910)	0.831 (0.790 to 0.870)	−0.057 (−0.113 to −0.007)	Radiologists
Consolidation	0.841 (0.815 to 0.870)	0.893 (0.859 to 0.924)	0.052 (−0.001 to 0.101)	No difference
Edema	0.910 (0.886 to 0.930)	0.924 (0.886 to 0.955)	0.015 (−0.038 to 0.060)	No difference
Effusion	0.900 (0.876 to 0.921)	0.901 (0.868 to 0.930)	0.000 (−0.042 to 0.040)	No difference
Emphysema	0.911 (0.866 to 0.947)	0.704 (0.567 to 0.833)	−0.208 (−0.508 to −0.003)	Radiologists
Fibrosis	0.897 (0.840 to 0.936)	0.806 (0.719 to 0.884)	−0.091 (−0.198 to 0.016)	No difference
Hernia	0.985 (0.974 to 0.991)	0.851 (0.785 to 0.909)	−0.133 (−0.236 to −0.055)	Radiologists
Infiltration	0.734 (0.688 to 0.779)	0.721 (0.651 to 0.786)	−0.013 (−0.107 to 0.067)	No difference
Mass	0.886 (0.856 to 0.913)	0.909 (0.864 to 0.948)	0.024 (−0.041 to 0.080)	No difference
Nodule	0.899 (0.869 to 0.924)	0.894 (0.853 to 0.930)	−0.005 (−0.058 to 0.044)	No difference
Pleural thickening	0.779 (0.740 to 0.809)	0.798 (0.744 to 0.849)	0.019 (−0.056 to 0.094)	No difference
Pneumonia	0.823 (0.779 to 0.856)	0.851 (0.781 to 0.911)	0.028 (−0.087 to 0.125)	No difference
Pneumothorax	0.940 (0.912 to 0.962)	0.944 (0.915 to 0.969)	0.004 (−0.040 to 0.051)	No difference

GENERATIVE ADVERSARIAL TRAINING FOR MRA IMAGE SYNTHESIS USING MULTI-CONTRAST MRI-1

- Authors:
  - Sahin Olut
  - Yusuf H. Sahin
  - Ugur Demir
  - Gozde Unal



ARTIFICIAL INTELLIGENCE SYSTEMS IN MEDICINE

- AIS systems in skin diseases
- AI system in Diabetic retinopathy
- AI systems in Radiology
- AI systems in Gastro endoscopy
- AI system in Coronary angiography
- AI systems in Primary health care
- AI systems in Intensive care unit
- AI systems in Microbiology
- AI systems in epidemiology
- AI systems in Drug discovery
- AI systems in Hepatic resection

Detection Of Breast Cancer By Mammograms

DETECTING AND CLASSIFYING LESIONS IN MAMMOGRAMS WITH DEEP LEARNING-1

- Authors:
  - Dezső Ribli1,
  - Anna Horváth
  - Zsuzsa Unger
  - Péter Pollner
  - István Csabai

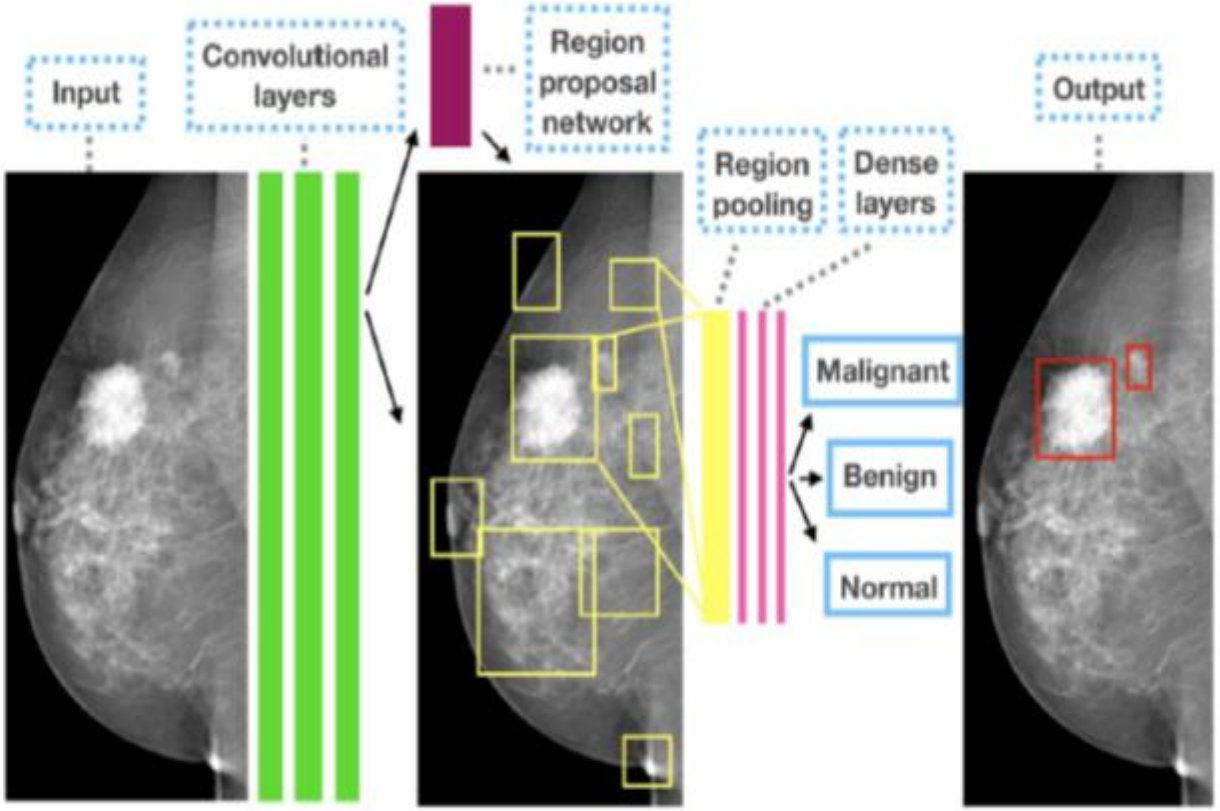
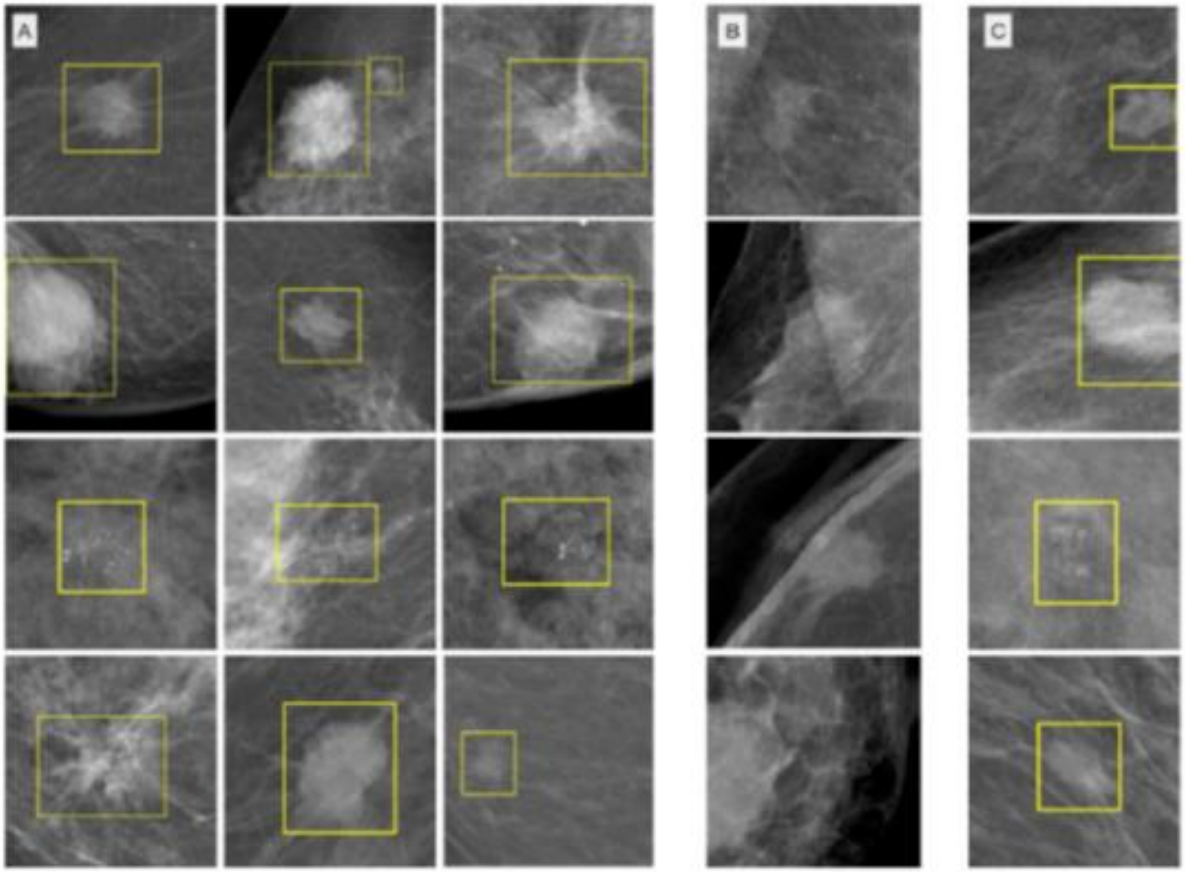


Figure 1. The outline of the Faster R-CNN model for CAD in mammography.

Detecting And Classifying Lesions In Mammograms With Deep Learning-2

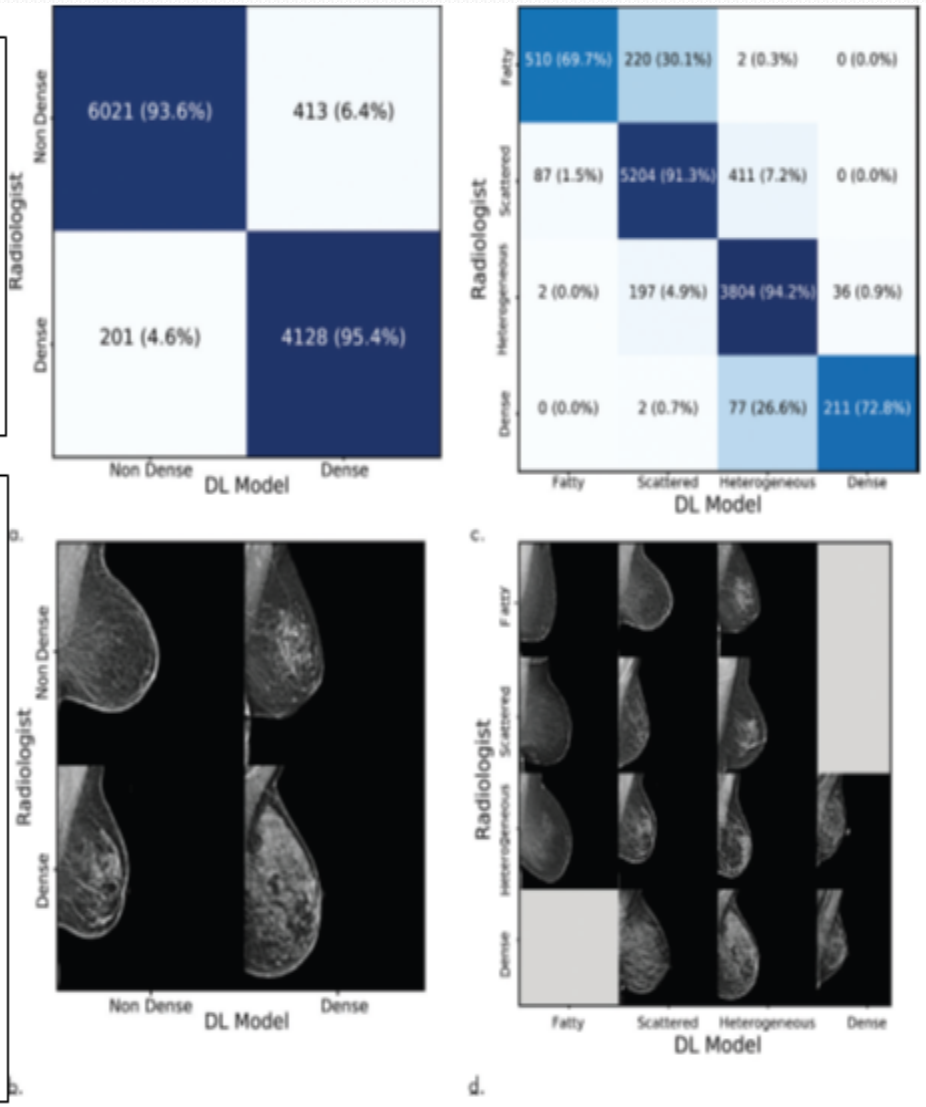


MAMMOGRAPHIC BREAST DENSITY ASSESSMENT USING DEEP LEARNING: CLINICAL IMPLEMENTATION

CONSTANCE D. LEHMAN, MD, PHD • ADAM YALA, MENG • TAL SCHUSTER, MSC • BRIAN DONTCHOS, MD • MANISHA BAHL, MD, MPH • KYLE SWANSON, BS • REGINA BARZILAY, PHD

RADIOLOGY 2019; 290:52–58 HTTPS://DOI.ORG/10.1148/RADIOL.2018180694

Summary:
Our DL model provides efficient and reliable density assessments, both at the patient level and at the population level, and it is designed to be widely available, simple to use, and cost effective. It can be used to measure breast density in a diverse set of patients, without limitations based on prior surgery or other breast interventions.
Our tool can potentially address concerns for current breast density legislation, and it can help providers supply more accurate information to patients and help health systems optimize the use of supplemental screening resources.



COMPUTER VISION AND ARTIFICIAL INTELLIGENCE IN MAMMOGRAPHY

CARL J. VYBORNY1'2 AND MARYELLEN L. GIGER2

AJR 1994;162:699-708 0361-803X/94/1623-0699 ©
AMERICAN ROENTGEN RAY SOCIETY

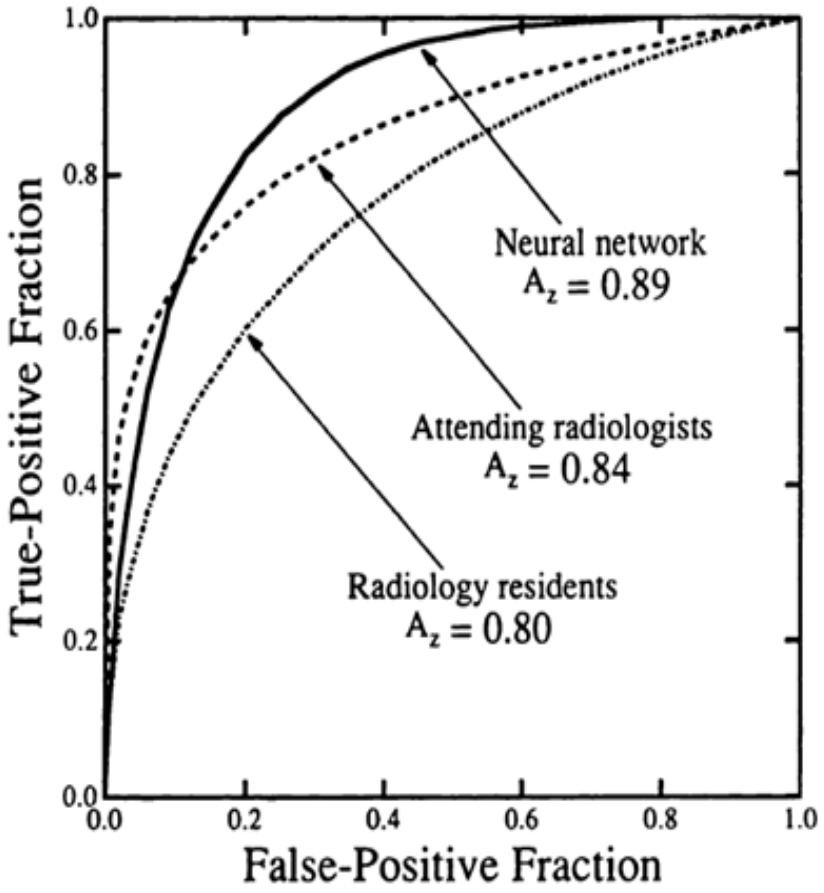


Fig. 10.—Receiver operating curves comparing performance of attending radiologists, radiology residents, and a neural network that used features extracted by an experienced radiologist in characterizing 60 mammographic lesions as benign or malignant. (Reprinted with permission from Wu et al. [77].)

ARTIFICIAL INTELLIGENCE IN BREAST IMAGING: POTENTIALS AND LIMITATIONS

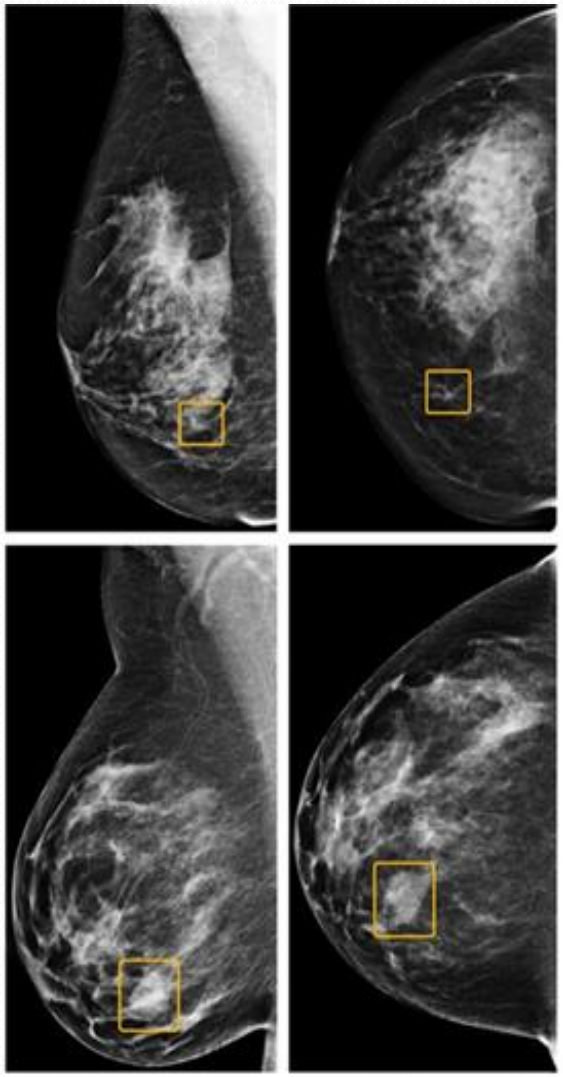
ELLEN B. MENDELSON AMERICAN ROENTGEN RAY SOCIETY DOI.ORG/10.2214/AJR.18.20532

TABLE 1: Breast Imaging Studies Using Artificial Intelligence (AI)

Study	Type or Purpose	AI Technique	Input	Dataset	Results or Conclusion
Cai et al. [58]	ML test combined morphologic and kinetic features of DWI and contrast-enhanced MRI for improved discrimination with multisided variables	Semiautomated segmentation	DW or contrast-enhanced MR images; pathology	234 Patients with 85 benign and 149 malignant lesions	7 Features combined greatest classification accuracy; sensitivity, 0.85; specificity, 0.89; AUC, 90.9%; accuracy, 0.93
Jerez et al. [59]	ANN compared with Cox proportional hazard method for predicting breast cancer relapse	Three-layer neural network, each input node corresponding to prognostic factor plus one node for time; one hidden layer, one output layer	Prognostic factors: age, tumor size, axillary node status, histologic grade, type of treatment; survival time (months)	Demographics, therapeutics, and recurrence-survival data of 3811 El Alamo participants[a]	Same features significant predictors, but more accurate prediction including time of relapse with ANN
Qiu et al. [55]	DL to develop CADx scheme for breast mass classification	CNN: 8 layers with three pairs convolution layers; automated classification	Images (digital mammograms)	560 ROIs for automated feature extraction and categorization	Feasibility of applying DL-based CADx to differentiate benign from malignant masses; overall AUC, 0.790 ± 0.019
Saritas [35]	ML and breast cancer prediction	ANN, three layers, BI-RADS based	Mammograms with ROIs on masses, BI-RADS assessments of three features (shape, margin, density), patient age	822 Entries from 800 patients as described in input	BI-RADS features plus patient age can make accurate predictions (90.5%) in breast cancer severity diagnosis
van Zelst et al. [57]	CAD and screening workflow; observer study; eight readers	CAD software integrated into workstation	Automated breast ultrasound images of mammographically dense patients	120 Unilateral ABVS[b] examinations, 30 malignant and 30 benign	Decreased reading time using CAD 24.9 s/case (15.7%) from 158.3 s to 133.4 s/case

Note—ML = machine learning, ANN = artificial neural network, DL = deep learning, CADx = computer-aided diagnosis, CNN = convolutional neural network, CAD = computer-aided detection.
[a]The El Alamo project is a large Spanish breast cancer database.
[b]Automated Breast Volume Scanner (ABVS) is the name of the ultrasound system used by these investigators (Siemens Healthineers); ABUS is now a generic term for automated breast ultrasound.

Using imaging data of high quality and large quantity, AI's algorithms can aid breast imagers in diagnosis and patient management planning, but with algorithmic error possible and without solid evidence to support it, AI cannot and should not be relied on or responsible for physicians' decisions that may affect survival.

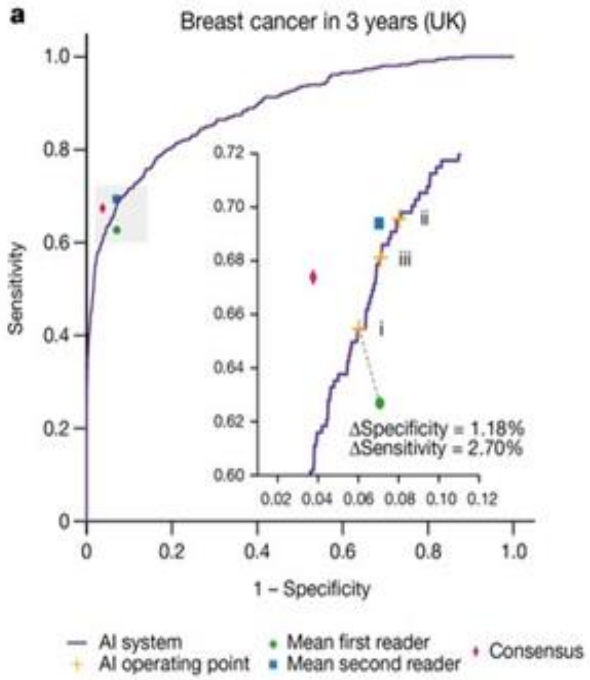


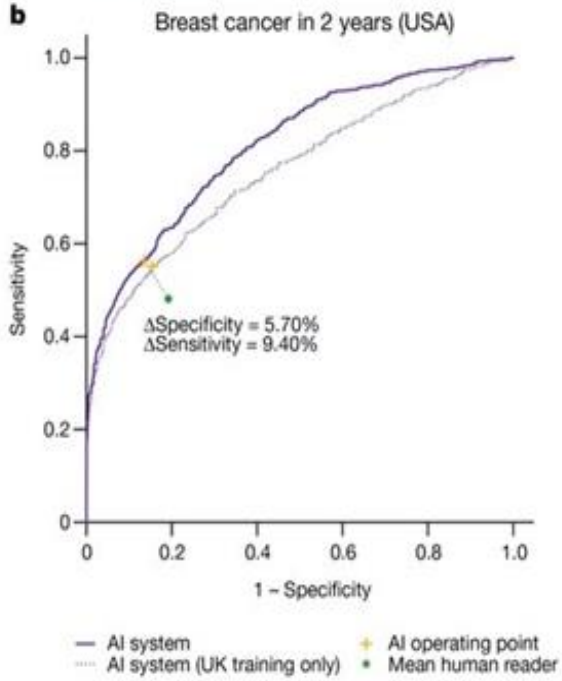
Discrepancies between the AI system and human readers.

International evaluation of an AI system for breast cancer screening

25,856 women
AUC 0.889

3,097 women
AUC 0.810



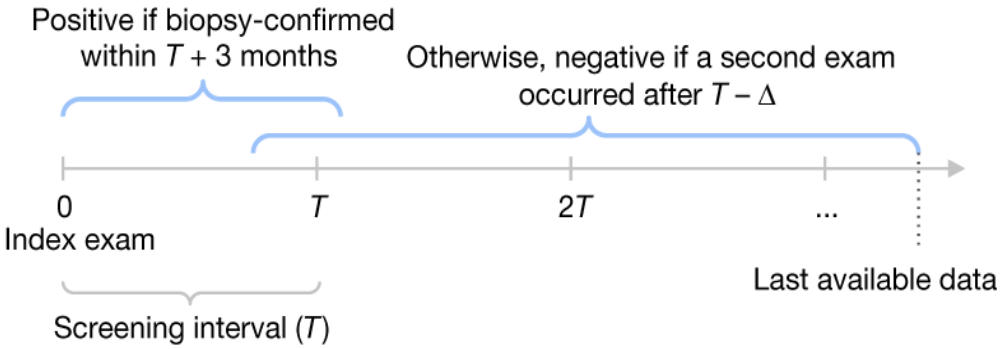


nature 1 January 2020

Test datasets

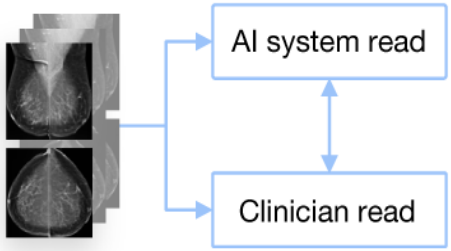
Number of women	25,856	3,097
Interpretation	Double reading	Single reading
Screening interval	3 years	1 or 2 years
Cancer follow-up	39 months	27 months
Number of cancers	414 (1.6%)	686 (22.2%)

Ground-truth determination



Evaluation

Comparison with retrospective clinical performance



UK and US test sets

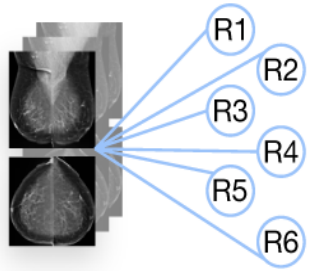
Generalization across datasets



Trained on UK training set

Tested on US test set

Independently conducted reader study



6 radiologists read 500 cases from US test set

INTERNATIONAL EVALUATION OF AN AI SYSTEM FOR BREAST CANCER SCREENING

SCOTT MAYER MCKINNEY, MARCIN SIENIEK, SHRAVYA SHETTY ; *NATURE* **VOL 577**, PAGES89–94(2020) JAN1

The algorithm, based on mammograms taken from more than 76,000 women in the U.K. and more than 15,000 in the U.S.,

Reduced false positive rates by nearly 6% in the U.S., where women are screened every one to two years, and by 1.2% in the U.K.,

The AI model also lowered false negatives by more than 9% in the U.S. and by nearly 3% in the U.K.

In an independent study of six radiologists, the AI system outperformed all of the human readers: the area under the receiver operating characteristic curve (AUC-ROC) for the AI system was greater than the AUC-ROC for the average radiologist by an absolute margin of 11.5%.

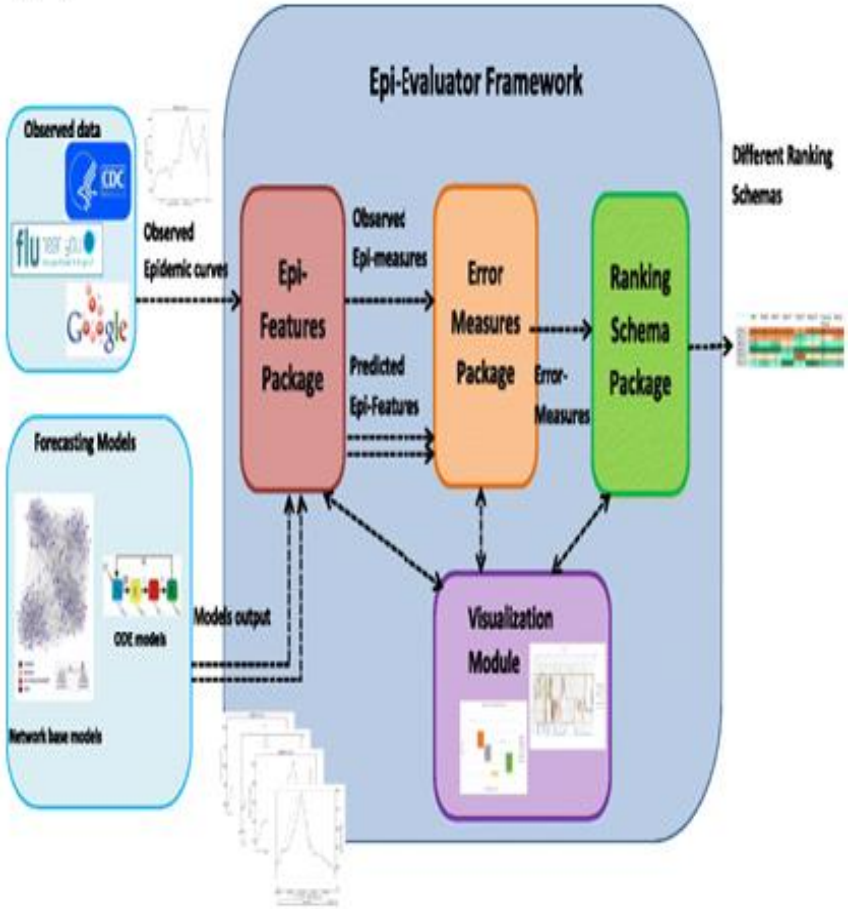
ARTIFICIAL INTELLIGENCE SYSTEMS IN MEDICINE

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- AI systems in Intensive care unit
- AI systems in Microbiology
- AI systems in epidemiology
- AI systems in Drug discovery
- AI systems in Anaesthesiology

AI SYSTEMS FOR EPIDEMIOLOGY

Madhav Marathe for epidemic in New York

Centres for Disease Control and Prevention (CDC), (NIH), Department of Health and Human Services (HHS) to encourage different research groups to provide forecasting methods for disease outbreaks such as Flu , Ebola , Dengue and Chikungunya .



DOCTORS USING ARTIFICIAL INTELLIGENCE TO TRACK CORONA VIRUS OUTBREAK

A TEAM IN BOSTON IS USING MACHINE LEARNING TO TRACK THE VIRUS.





DeepMind CEO Demis Hassabis.

GOOGLE'S DEEP MIND JUST SHARED AI-GENERATED PREDICTIONS ABOUT THE CORONAVIRUS THAT COULD HELP RESEARCHERS STEM THE GLOBAL OUTBREAK

- DeepMind, Google's AI unit, just published predictions of the protein structures associated with the coronavirus that causes the disease known as COVID-19.
- These predictions were drawn from DeepMind's new deep learning system but have yet to be experimentally verified, DeepMind noted in a blog post announcing their findings.
- DeepMind said that it would ordinarily wait for findings to be reviewed by an academic journal, but it's skipping that process given the "potential seriousness and time sensitivity of the situation."
- The predictions are open-sourced, allowing any researcher to build on, adapt or share DeepMind's findings.
- Visit Business Insider's homepage for more stories.

Artificial Intelligence Systems In Medical Education

- AI systems in Curriculum
- AI systems in Academic Goverence
- AI systems Dynamic Real time assessment of student
- AI systems in Self Directed Learning
- AI system In Assessment
- AI systems for CPE of CBME
- AI systems in Resource Management

- Applications and Challenges of Implementing Artificial Intelligence in Medical Education: Integrative Review
- Kai Siang Chan1*; Nabil Zary1,2*, PhD
- http://mededu.jmir.org/2019/1/e13930/

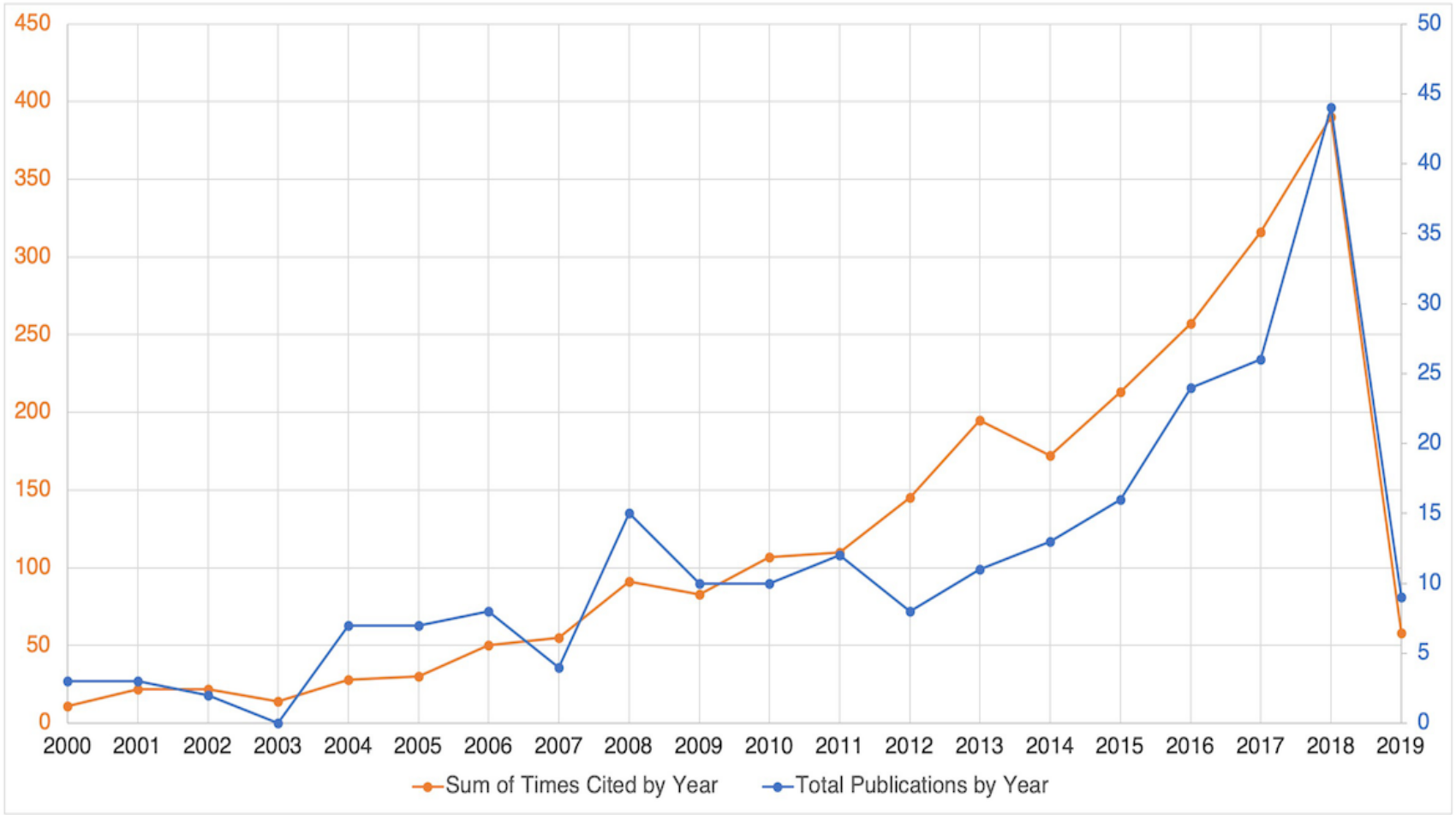
Results:

- A total of 37 articles were identified. Three primary uses of AI in medical education were identified: learning support (n=32), assessment of students' learning (n=4), and curriculum review (n=1).
- The main reasons for use of AI are its ability to provide feedback and a guided learning pathway and to decrease costs. Subgroup analysis revealed that medical undergraduates are the primary target audience for AI use.
- In addition, 34 articles described the challenges of AI implementation in medical education;
- Two main reasons were identified: difficulty in assessing the effectiveness of AI in medical education and technical challenges while developing AI applications.

Overview of the current uses of artificial intelligence in medical education identified from review of 37 full-text articles.

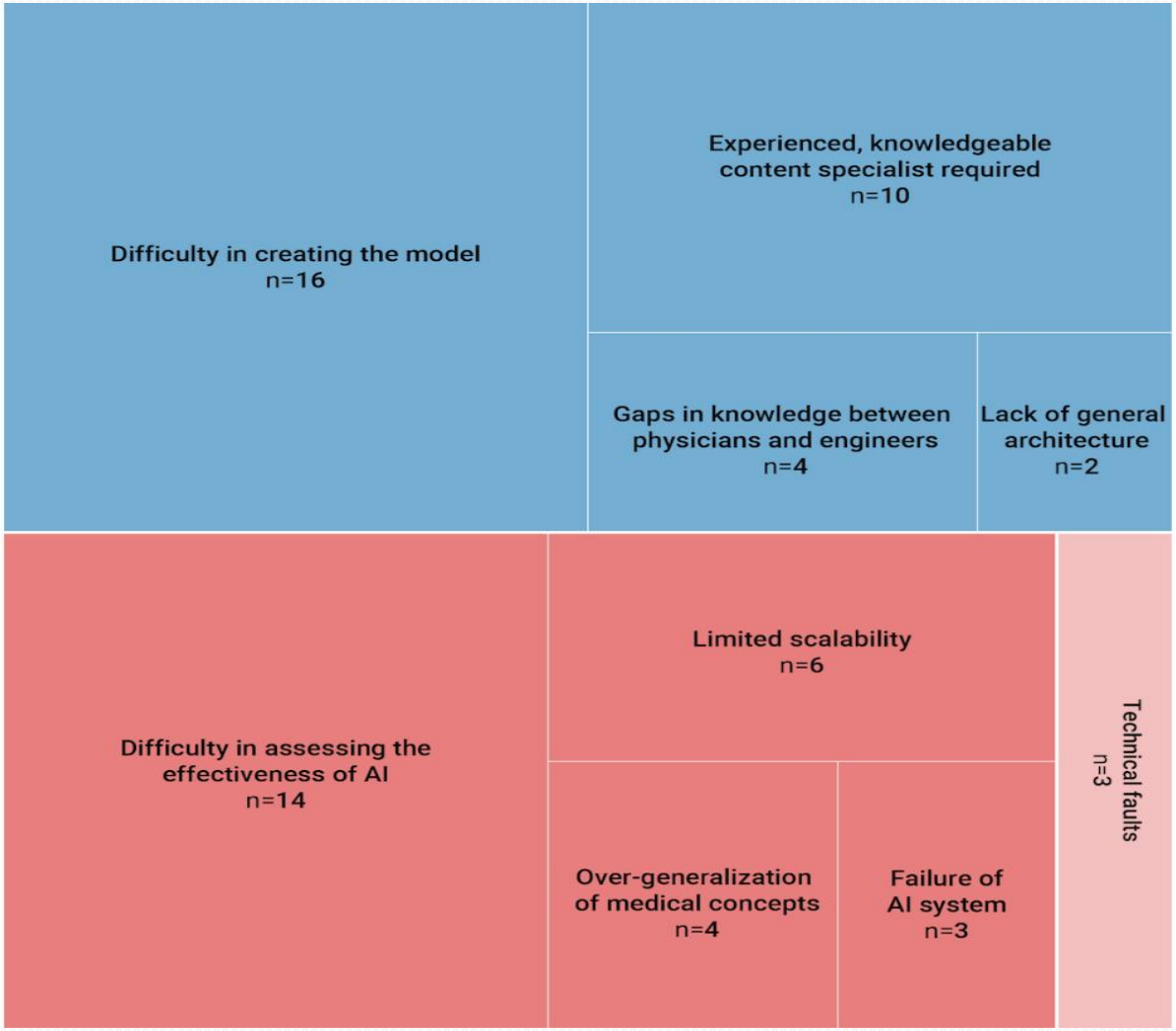
Focus and advantages of use	Total number of articles
Comprehensive analysis of the curriculum	1
Learning	
Feedback for learning	21
Evaluation of the learning process with guided learning pathway	18
Decreased costs	8
No harm to patients	6
Less teacher supervision required	3
Assessment	
Quicker assessment	4
Objective assessment	3
Feedback on assessment	2
Decreased costs	1

Total publications and sum of times cited by year in the last two decades. Retrieved from Web of Science for artificial intelligence in medical education, dated April 1, 2019



http://mededu.jmir.org/2019/1/e13930/

Hierarchical Presentation Of The Challenges Of Implementation Of Artificial Intelligence (AI) In Medical Education. The Upper Blue Rectangle Shows The Proportion Of Articles In Each Challenge Category In The Technical Aspects Of AI. The Lower Red Rectangle Shows The Proportion Of Articles For Challenges Relating To Perceived Usefulness (In Red) And Perceived Ease Of Use (In Light Red).



Kai Siang Chan1; Nabil Zary
JMIR Med Educ 2019;5(1):e13930)
doi: 10.2196/13930

Conclusions:

- The primary use of AI in medical education was for learning support mainly due to its ability to provide individualized feedback. Little emphasis was placed on curriculum review and assessment of students' learning due to the lack of digitalization and sensitive nature of examinations, respectively.
- Big data manipulation also warrants the need to ensure data integrity.
- Methodological improvements are required to increase AI adoption by addressing the technical difficulties of creating an AI application and using novel methods to assess the effectiveness of AI.
- To better integrate AI into the medical profession, measures should be taken to introduce AI into the medical school curriculum for medical professionals to better understand AI algorithms and maximize its use.

AI Techniques Can Be Implemented At 3 Levels Of Medical Education:

Tushar Garg, Medical Student quoting Noorbakhsh-Sabet

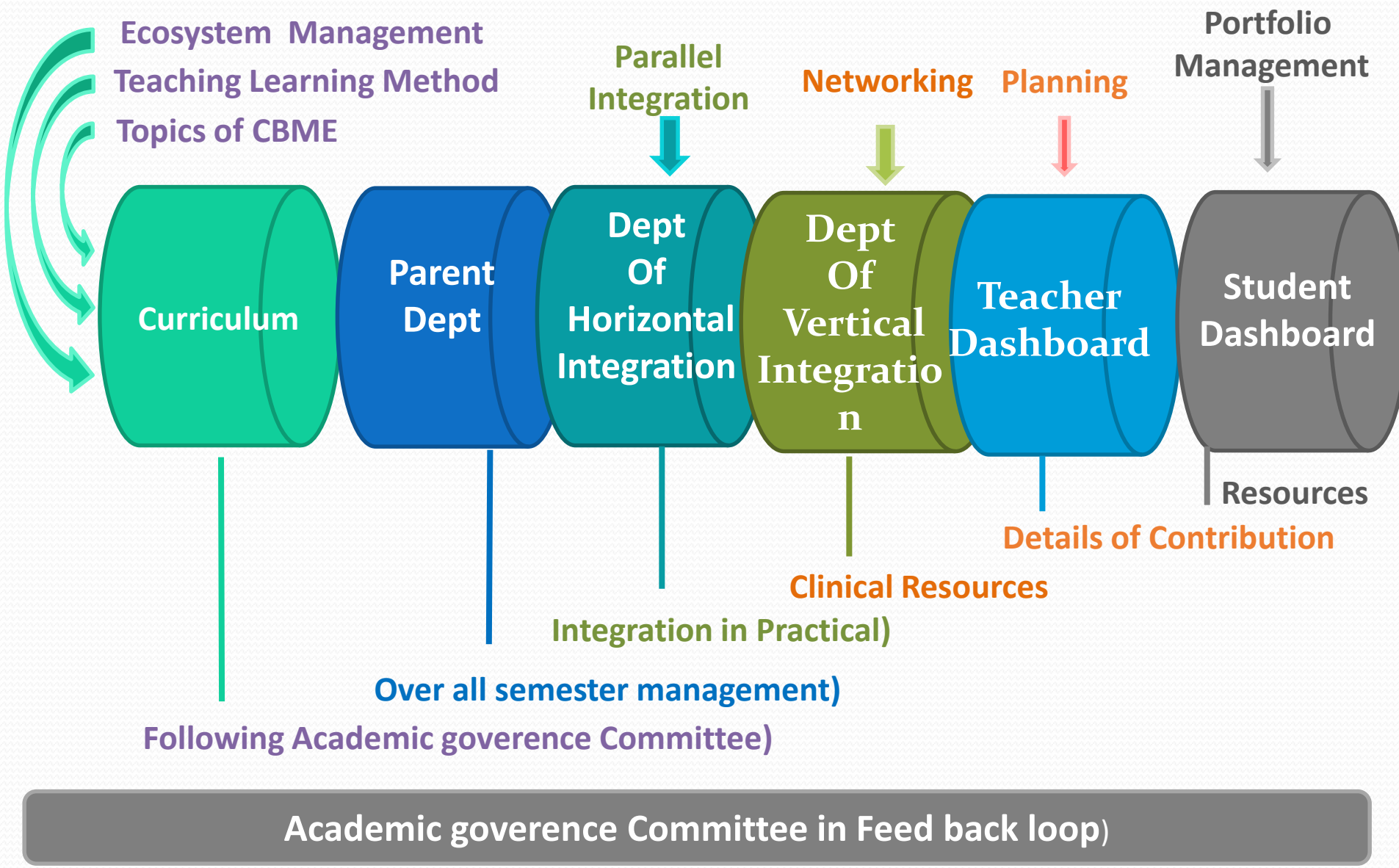
- Curriculum development and analysis, learning, and assessment.
- In curriculum assessment,
  - the use of AI helps to decrease the time needed to evaluate multiple curriculums,
  - solve multidimensional problems, provide greater classification accuracy, and establish a relationship between different variables.
- AI can be used to check the effectiveness of the curriculum and overall satisfaction of the medical

  students with the program, as this is important in training future doctors.
- In the learning process,
  - AI can help to provide students with adaptive and personalized educational content, which is further improved with student feedback and this, therefore, allows students to identify knowledge gaps and respond to them effectively
- Assessment of learning with the help of AI can help make the process of evaluation
  - more objective, fast, cost-efficient, and
  - provide extensive individualized feedback.

Artificial Intelligence Systems In Medical Education

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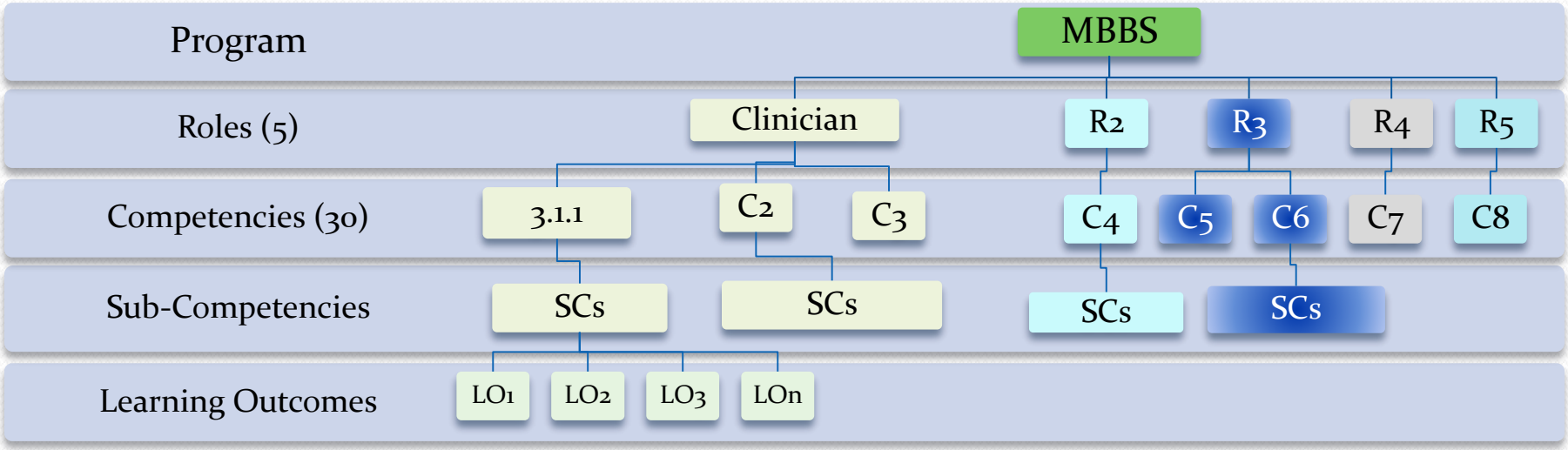
Academic Governance



Curriculum Committee

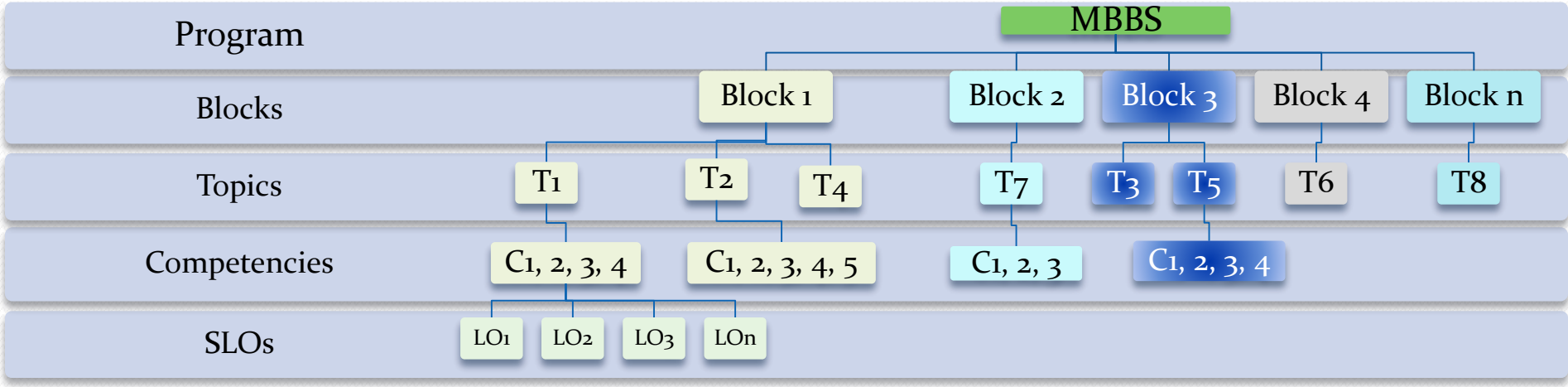
Competency-driven
Medical Education Technology

Curricular Governance



To compute the LO attainment, define parameters such as Students Performance Thresholds, Weightages, etc

Curricular Governance



To compute the LO attainment, define parameters such as Students Performance Thresholds, Weightages, etc

Competency Based Medical Education

Curriculum Committe



- Dashboard
- Physiology
  - Competencies
  - Teaching-Learning Methods
  - Assessment Methods
  - Integration
  - General Medicene
- Human Anatomy
- Biochemistry

CG | CBA | QBs | LMS | Help

1st Phase Curriculum | 2nd Phase Curriculum | 3rd Phase Curriculum

Physiology | Human Anatomy | BioChem | General Medicine | Anaesthesiology | Pharmacology | Pathology

Topic	No. Competencie	Procedures for certification	HV	VI
General Physiology	9	nil	Pathology	Biochem
Haematology	13	nil	General Anaesthesiolo Pharmacology Pathology	Human Anatomy Biochemistry
Cardiovascular Physiology	16	03	General Medicine	Human Anatomy

Topic Outcome

Status

Select Batch

Competency based Curriculum

Select Course

- ✓ PY - 2019 - Year I - CBC Cardiovascular Physiology
- PY - 2019 - Year I - CBC Endocrine Physiology
- PY - 2019 - Year I - CBC Gastro-intestinal Physiology
- PY - 2019 - Year I - CBC General Physiology
- PY - 2019 - Year I - CBC Haematology
- PY - 2019 - Year I - CBC Integrated Physiology
- PY - 2019 - Year I - CBC Nerve PYd Muscle Physiology
- PY - 2019 - Year I - CBC Neurophysiology
- PY - 2019 - Year I - CBC Renal Physiology
- PY - 2019 - Year I - CBC Reproductive Physiology
- PY - 2019 - Year I - CBC Respiratory Physiology

Approved and Final

Update

Topic Outcome | Institution Goals

Topic Outcome for PY - ... Physiology

Name	Description		Associated Levels of competency	Associated Domains of learning
CBC PY 5. 1	Describe the functional ... of heart including chambers, sounds; and Pacemaker tissue and conducting system.		KH - Knows How	Knowledge
CBC PY 5. 2	Describe the properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions	Topic Level Outcomes (TLO)	KH - Knows How	Knowledge
CBC PY 5. 3	Discuss the events occurring during the cardiac cycle	Topic Level Outcomes (TLO)	KH - Knows How	Knowledge
CBC PY 5. 4	Describe generation, conduction of cardiac impulse	Topic Level Outcomes (TLO)	KH - Knows How	Knowledge
CBC PY 5. 5	Describe the physiology of ...	Topic Level Outcomes (TLO)	KH - Knows How	Knowledge

Topic Outcome

Status

Select Batch

Human Anatomy

Select Course

- ✓ Anatomical terminology
- Axilla, Shoulder and Scapular region
- Features of individual bones (Upper Limb)
- General Features of lymphatic system
- General features of Muscle
- General features of bones And Joints
- General features of skin and fascia
- General features of the cardiovascular system
- Introduction to the nervous system
- Pectoral region

Approved and Final

Update

Topic Outcome | PO and Topic C

Topic Outcome for Anat

Name	Description		Associated Levels of Competencies
AN1.1	Demonstrate normal ar position, various planes, relation,comparison, laterality And movement in our body"		SH - Shows how
AN1.2	Describe composition of bone and bone marrow	Topic Level Outcomes (TLO)	KH - Knows how

History

Topic Outcome

Select Batch

Biochemistry

Basic Biochemistry
✓ Chemistry and Metabolism of Carbohydrates
Chemistry and Metabolism of Lipids
Chemistry and Metabolism of Proteins
Enzyme
Extracellular Matrix
Metabolism and homeostasis
Molecular biology
Nutrition
Oncogenesis and immunity

Topic Outcome | PO and Topic C

Status

Approved and Final

Update

Topic Outcome for Cher ohydrates

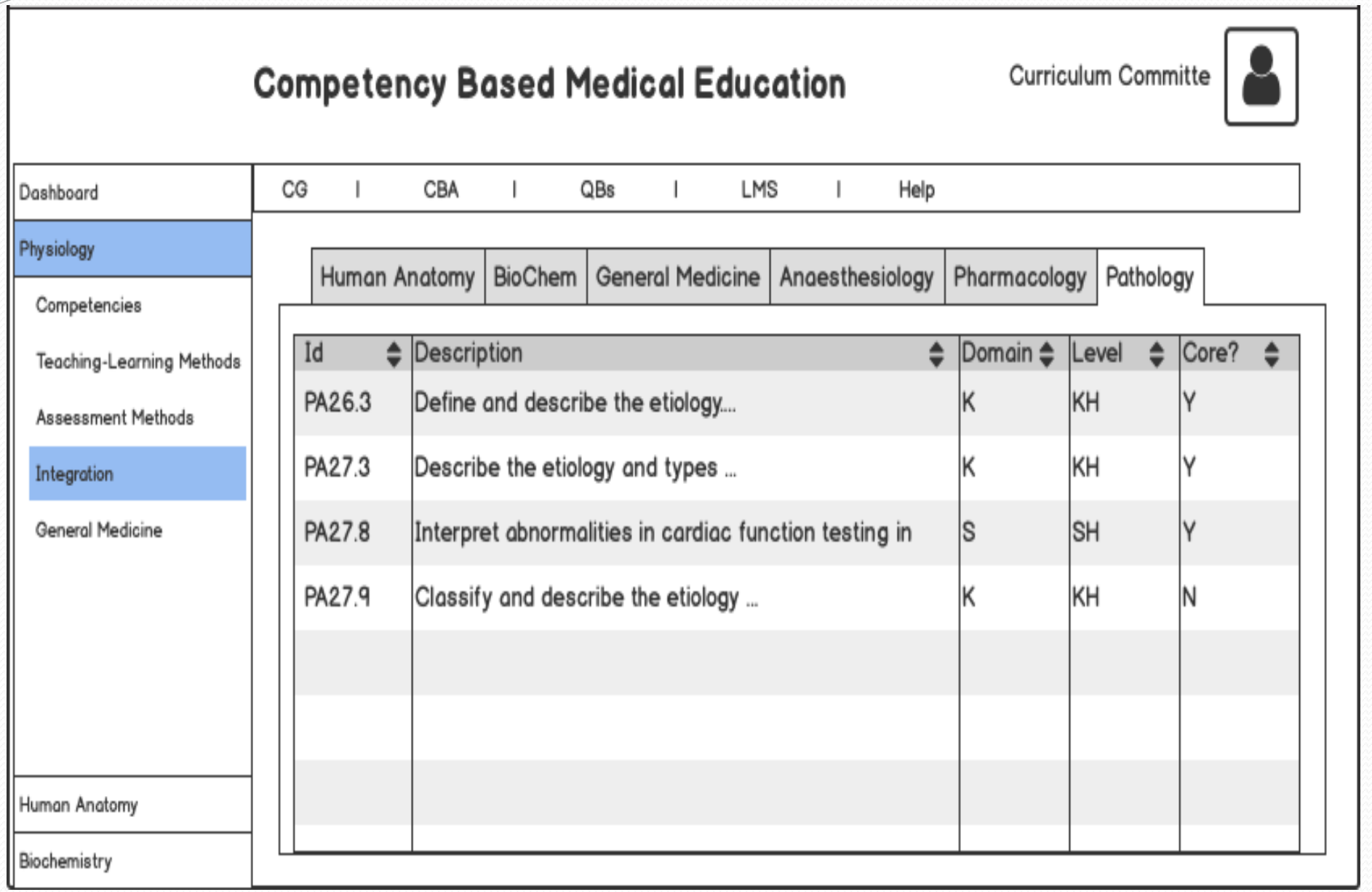
Name	Description		Associated Levels of Competencies
BI3.1	Discuss and differentiate monosaccharides, di-saccharides andpolysaccharides giving examples of main carbohydrates as energy fuel,structural element and storage in the human body"	Topic Level Outcomes (TLO)	KH - Knows how
BI3.10	Interpret the results of blood glucose levels and other laboratoryinvestigations related to disorders of carbohydrate metabolism."	Topic Level Outcomes (TLO)	KH - Knows how
BI3.2	Describe the processes involved in digestion and assimilation ofcarbohydrates and storage"	Topic Level Outcomes (TLO)	KH - Knows how

Topic Outcome | PO and Topic Outcome Mappings

Topic Outcome for PY - 2019 - Year I - CBC General Physiology

Name	Description	Topic Level Outcomes (TLO)	Associated Levels of Competencies
CBC PY 1.1	Describe the structure and functions of a mammalian cell	Topic Level Outcomes (TLO) CBC PY 1.1.TLO1 CBC PY 1.1.TLO2	KH - Knows how KH - Knows how KH - Knows how
CBC PY 1.2	Describe and discuss the principles of homeostasis	Topic Level Outcomes (TLO)	KH - Knows how
CBC PY 1.3	Describe inter-cellular communication	Topic Level Outcomes (TLO)	KH - Knows how
CBC PY 1.4	Describe apoptosis – programmed cell death	Topic Level Outcomes (TLO)	KH - Knows how
CBC PY 1.5	Describe and discuss transport mechanisms across cell membranes	Topic Level Outcomes (TLO)	KH - Knows how
CBC PY 1.6	Describe the fluid compartments of the body, its ionic composition & measurements	Topic Level Outcomes (TLO)	KH - Knows how
CBC PY 1.7	Describe the concept of pH & Buffer systems in the body	Topic Level Outcomes (TLO)	KH - Knows how
CBC PY 1.8	Describe and discuss the molecular basis of resting membrane potential and action potential in excitable tissue	Topic Level Outcomes (TLO)	KH - Knows how
CBC PY 1.9	Demonstrate the ability to describe and discuss the methods used to demonstrate the functions of the cells and its products, its communications and their applications in Clinical care and research.	Topic Level Outcomes (TLO)	KH - Knows how

Horizontal and Vertical Integration



Course Outcome level Attainment settings for PY - Master - Year I - CBC General Physiology

More Capture

Back

Enable Edit Settings

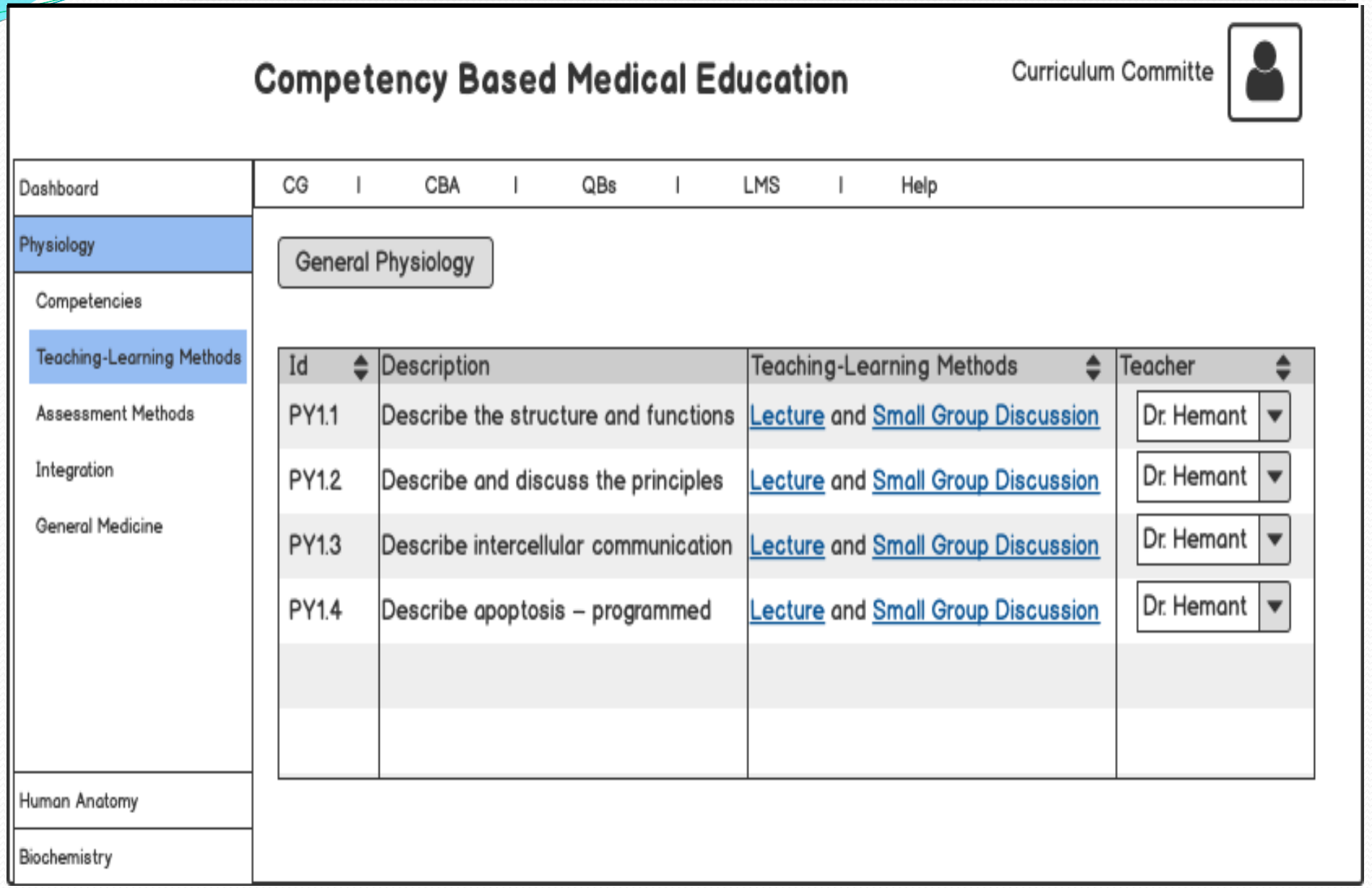
Return to List

Direct Assessments | Target of attainment and Levels | Bucket Settings

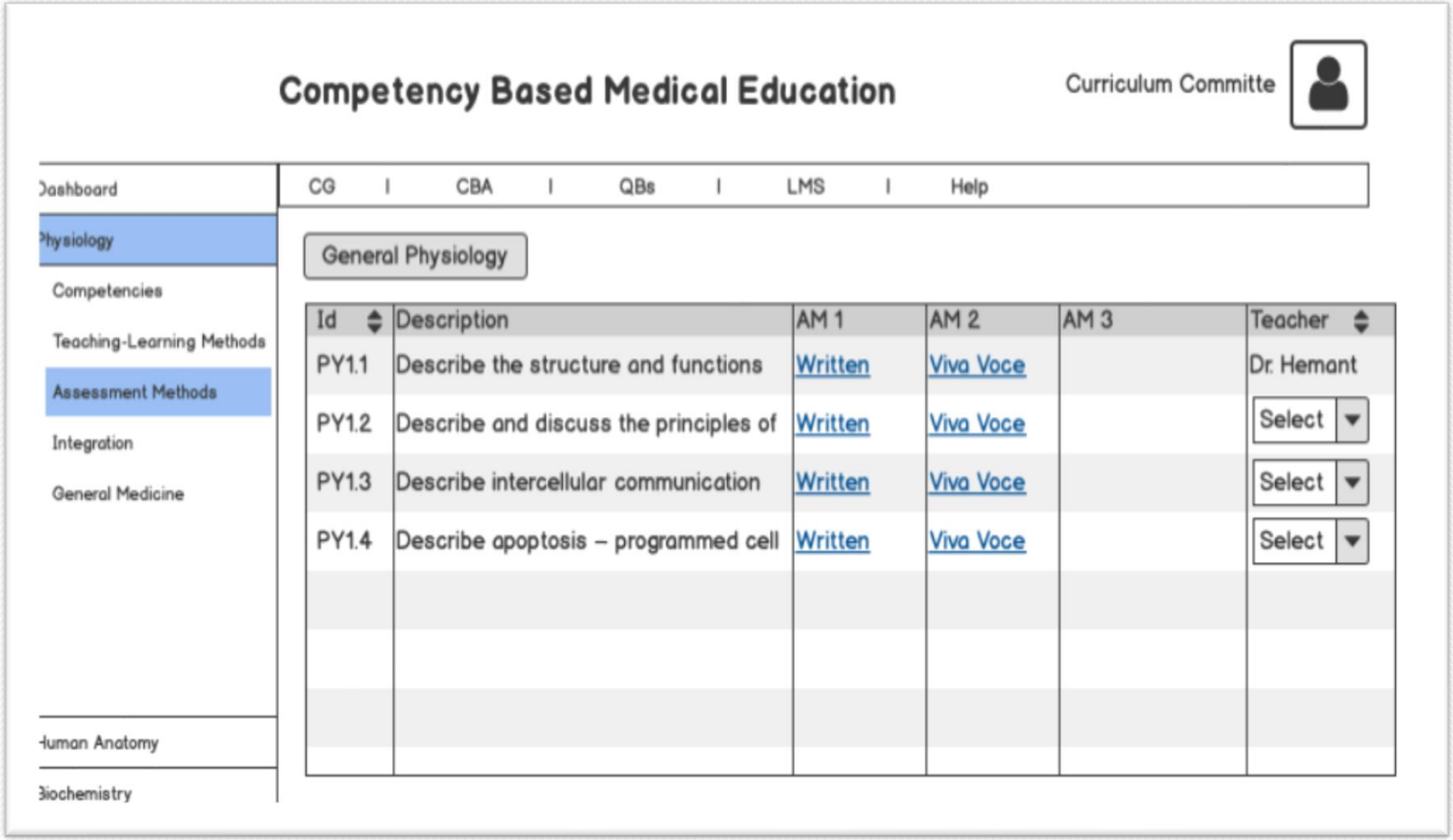
Direct Assessments

Course Outcomes	Student Performance Threshold % [?]
CBC PY 1.1	60
CBC PY 1.1	50
CBC PY 1.2	63
CBC PY 1.2	50
CBC PY 1.3	60
CBC PY 1.3	50

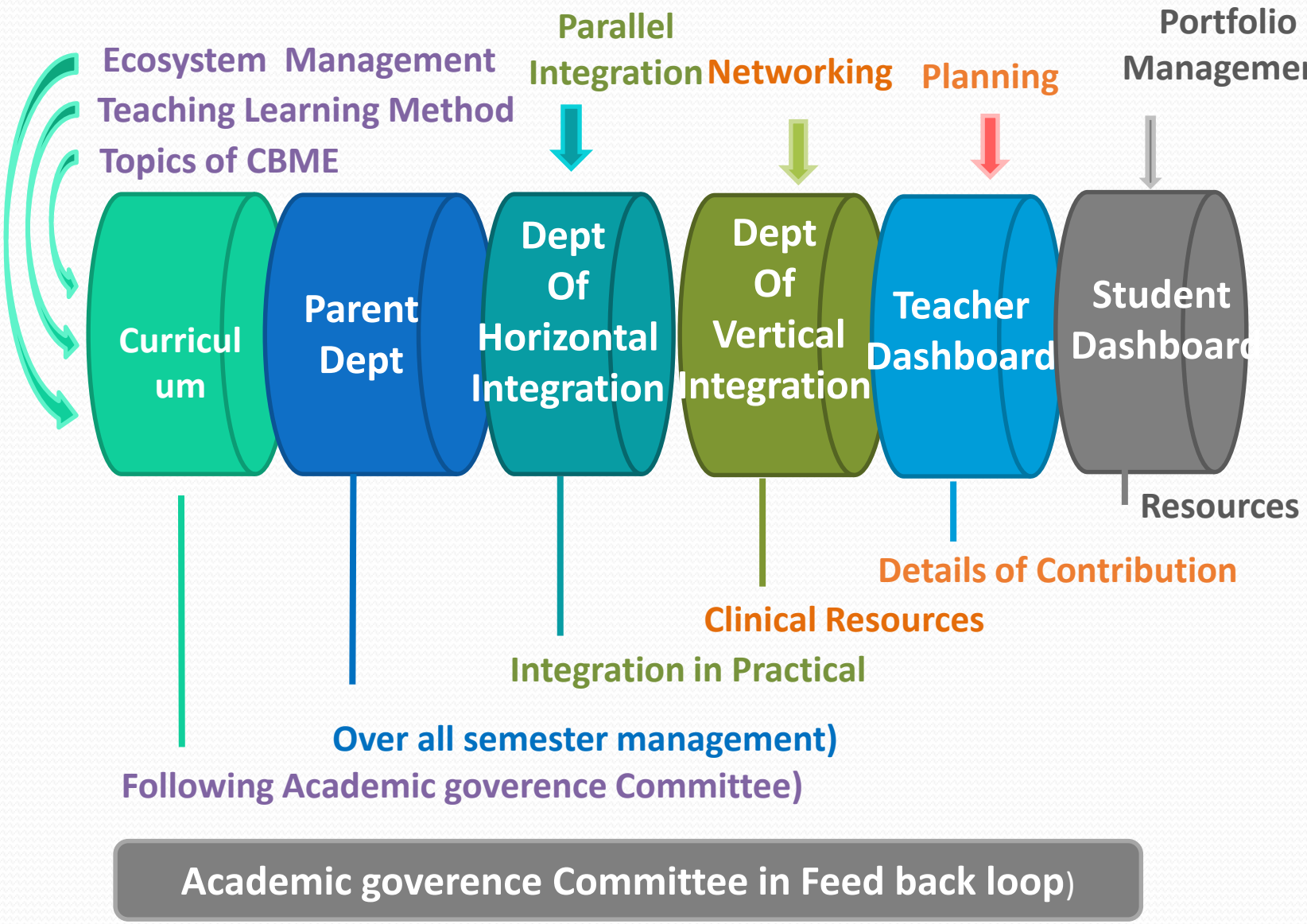
It can be programmed to map suitable Teaching Learning Methods



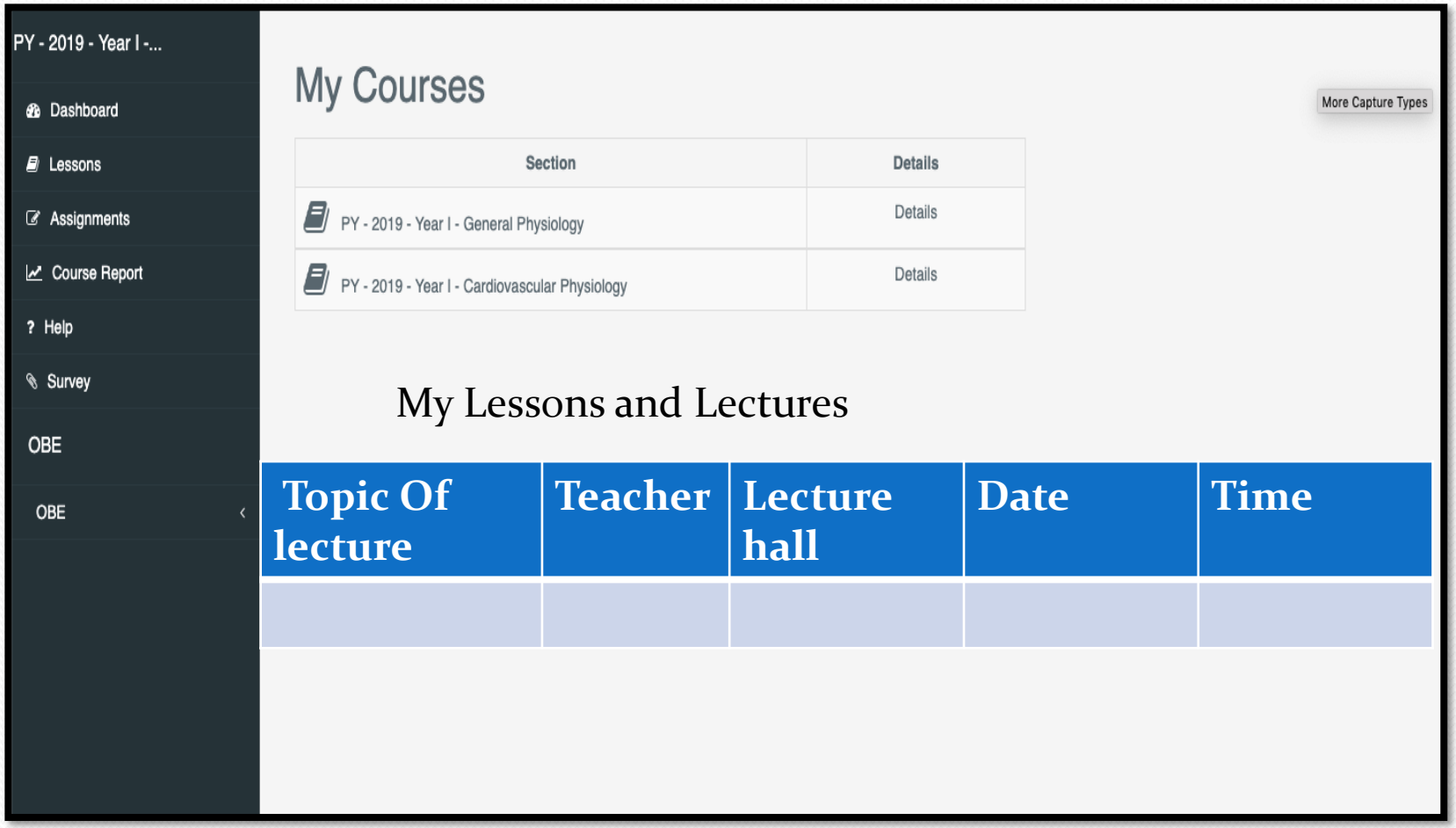
It can be programmed to map suitable Assessment Methods



Academic Governance



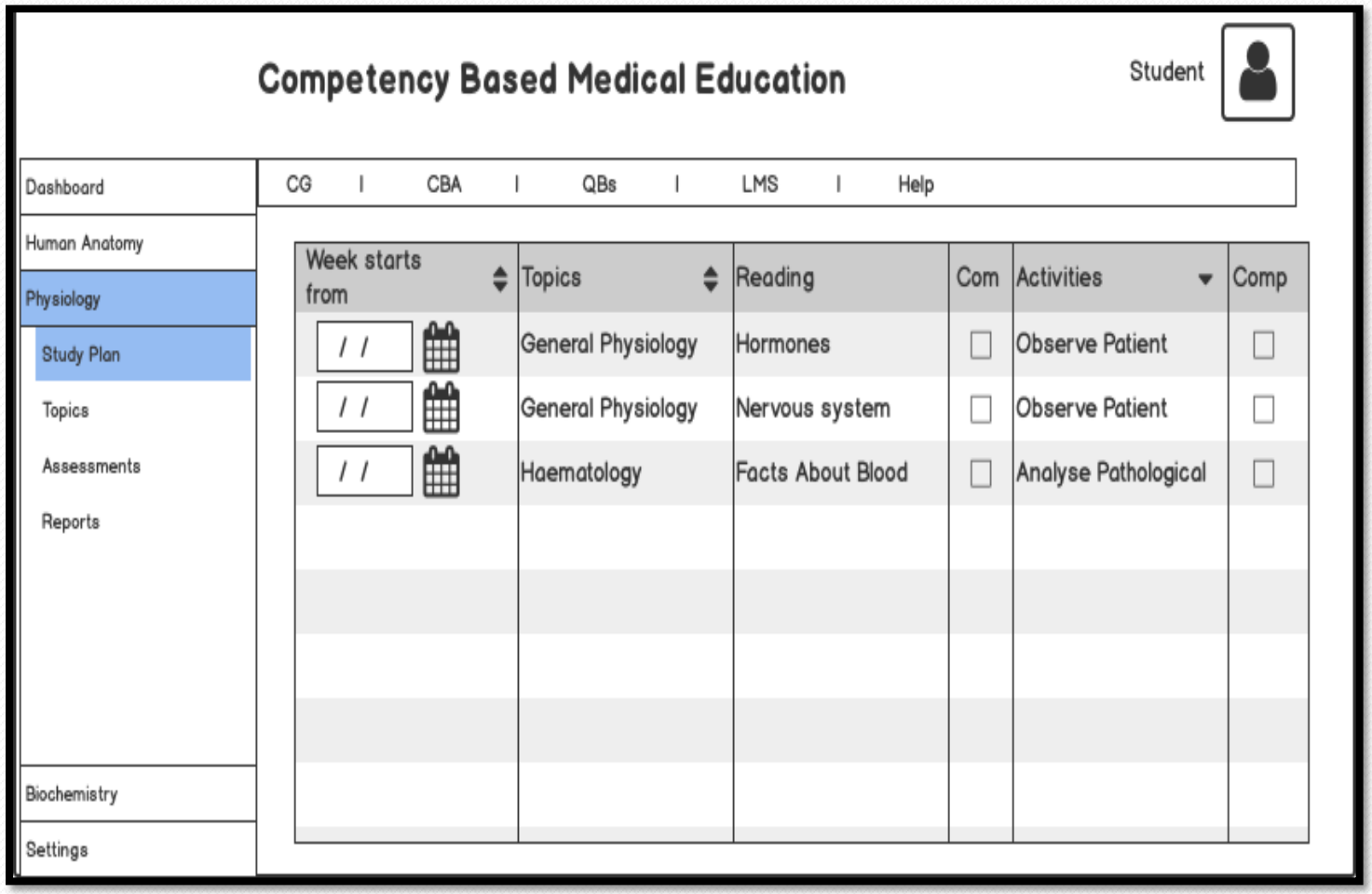
Student Dashboard



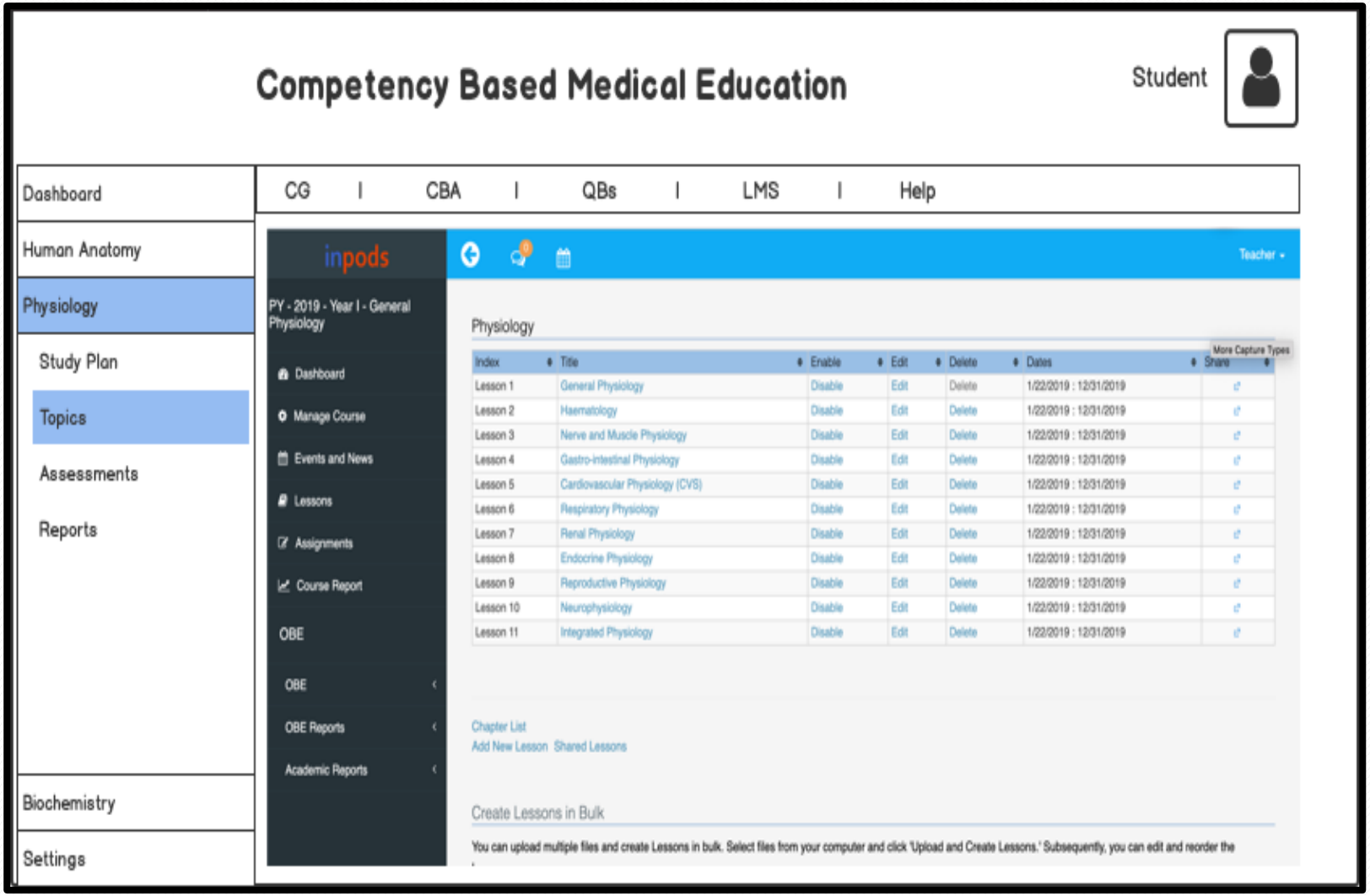
My Lessons and Lectures

Topic Of lecture	Teacher	Lecture hall	Date	Time

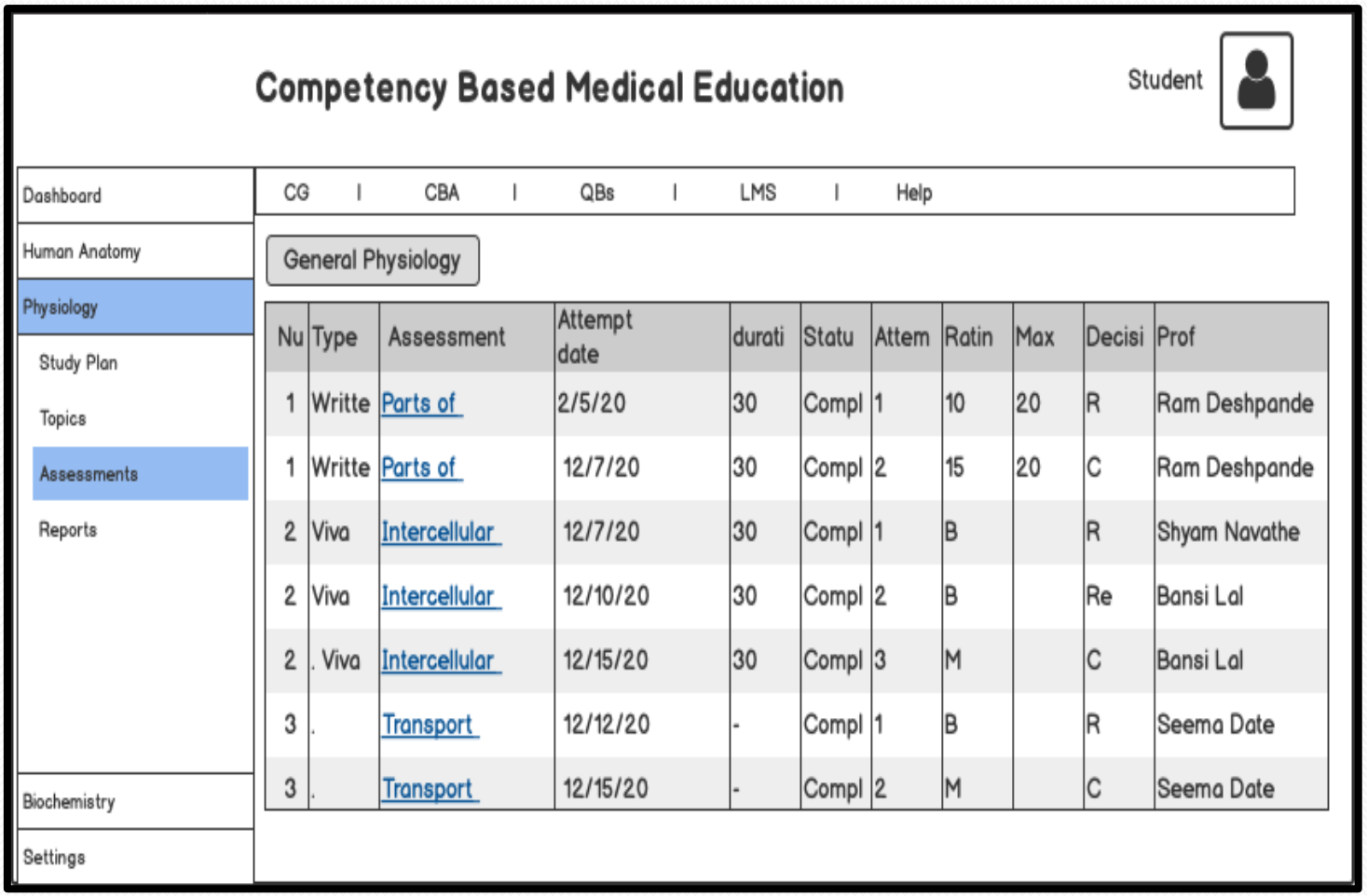
It can be programmed to map suitable Teaching Learning Methods



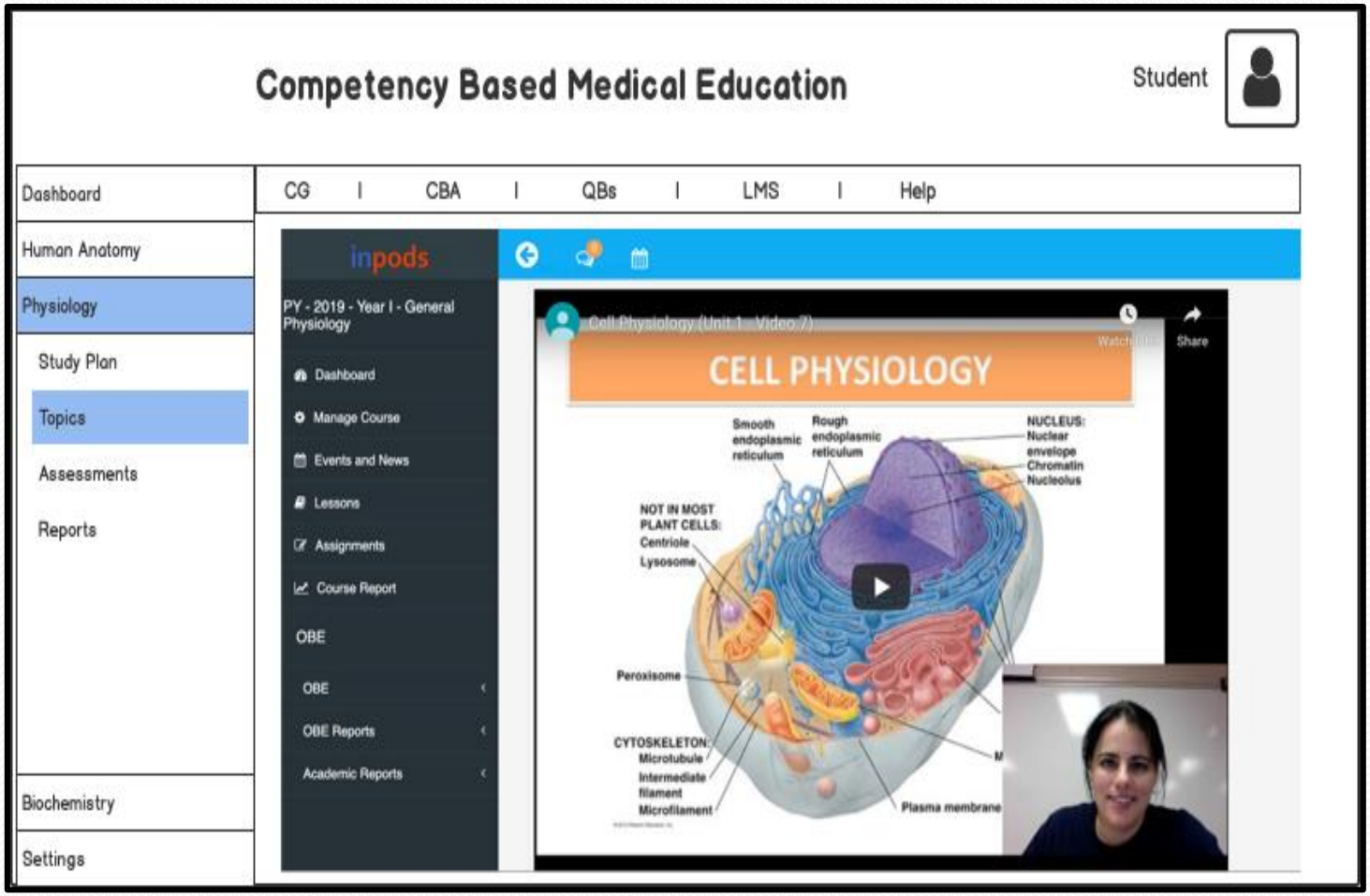
It can be programmed to map to assigned Teacher



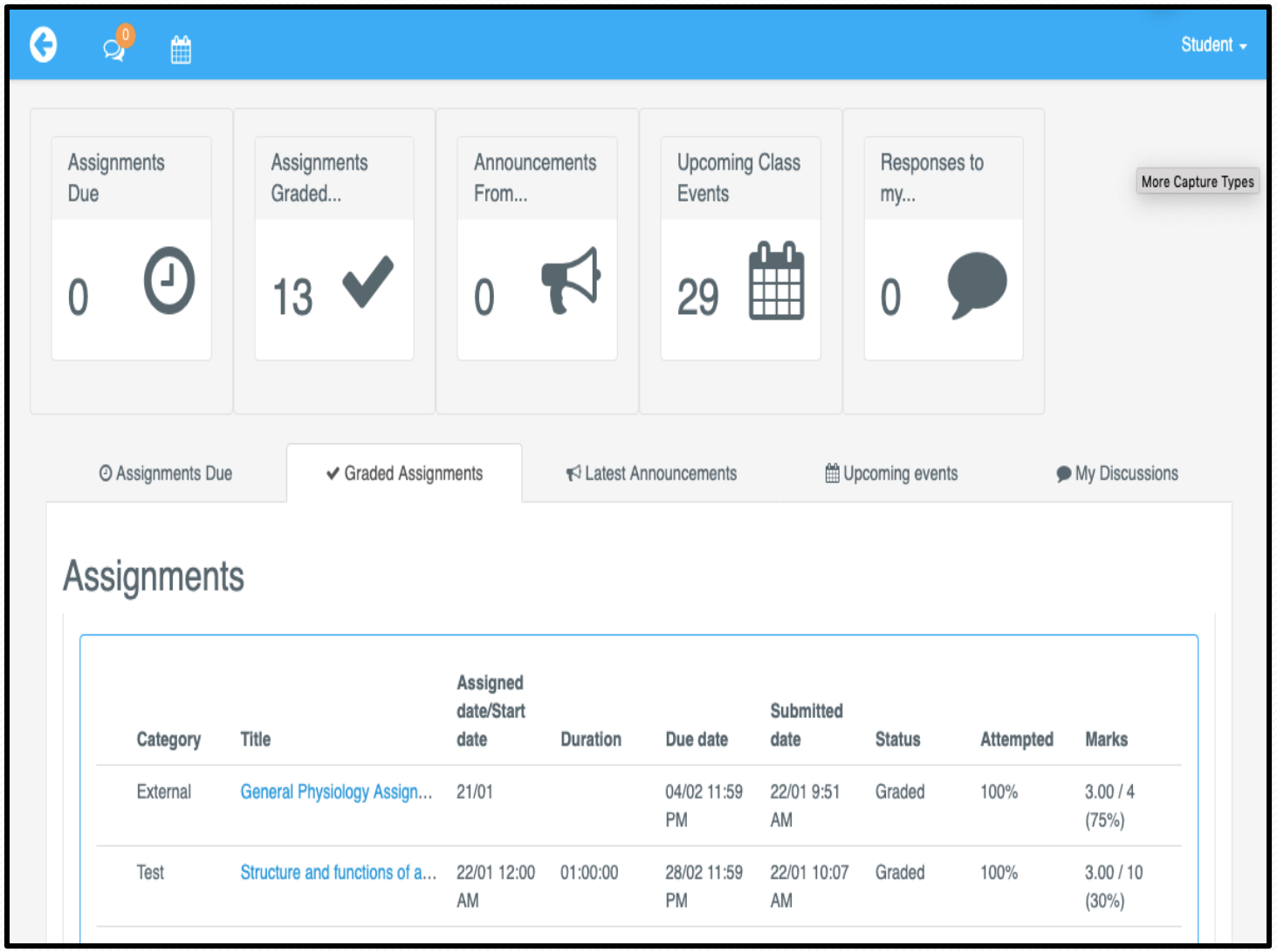
It can be programmed to map to assigned Teacher



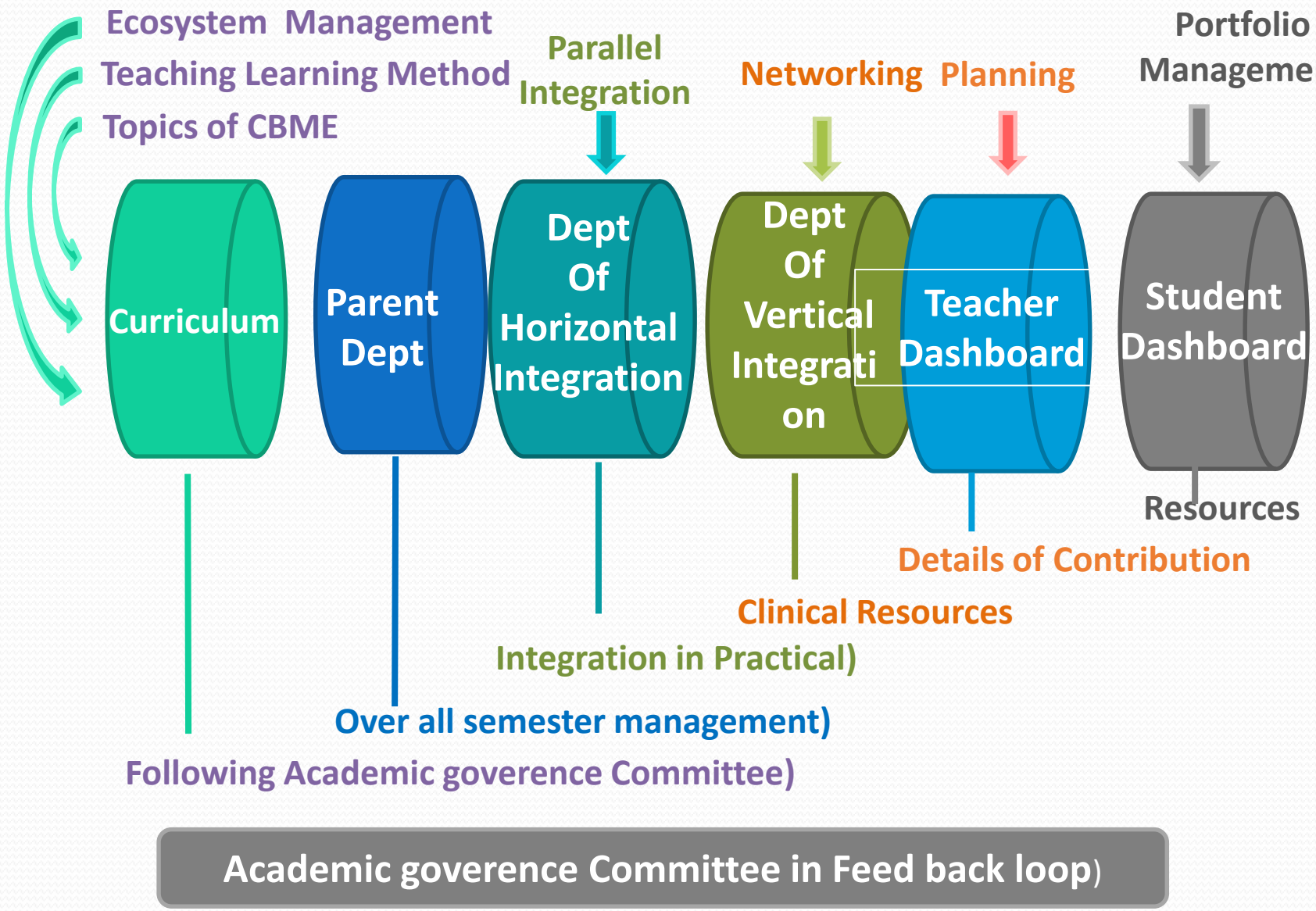
It can be programmed to map suitable Resources



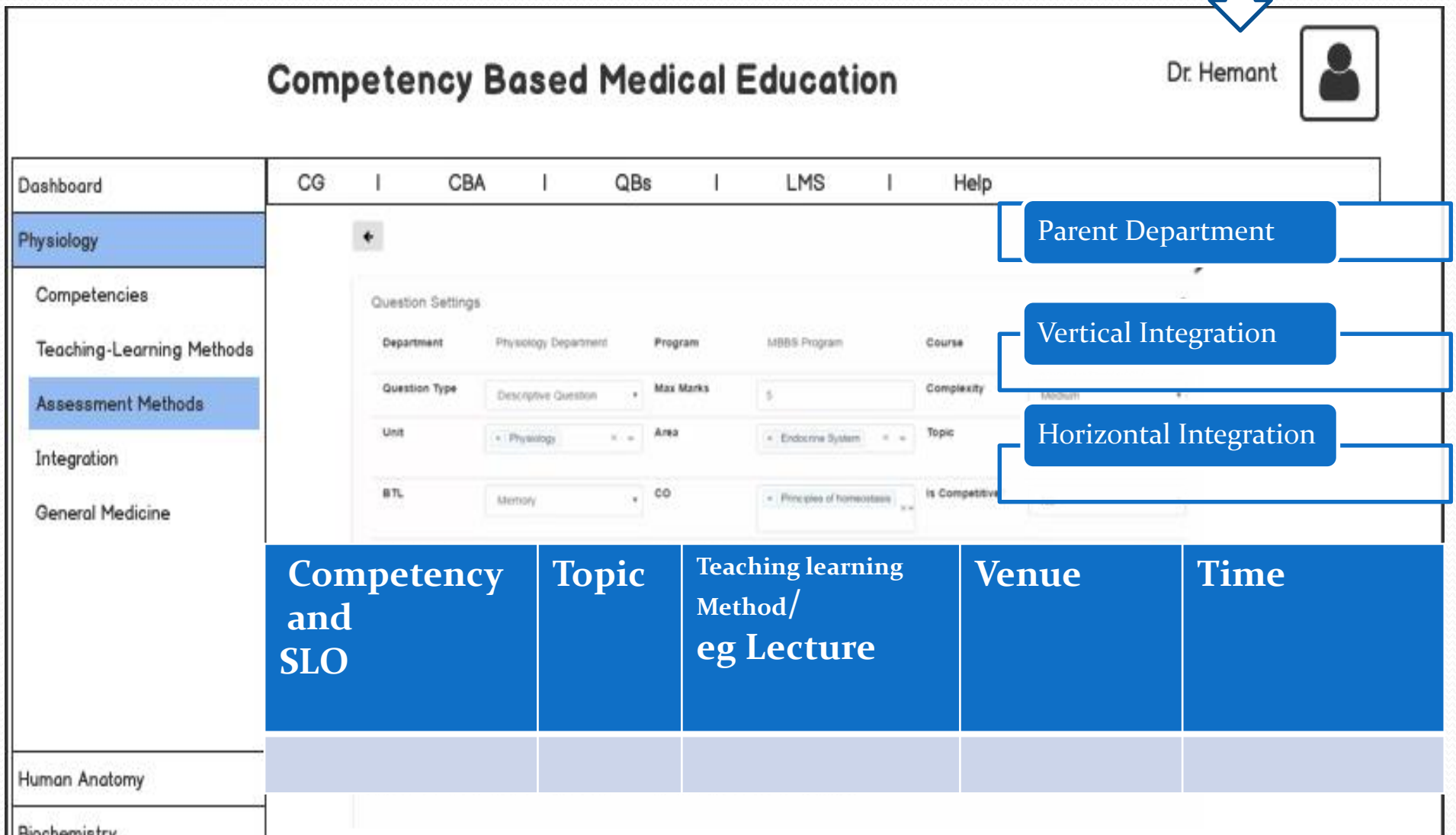
Student's Dashboard of a Course



Academic Governance



Teachers Dash board For Parent Dept, Department of Vertical Integration and Horizontal Integration



Academic Governance Dashboard for Teacher

Dr. Hemant 

- Dashboard
- Physiology
  - Competencies
  - Teaching-Learning Methods
  - Assessment Methods
  - Integration
  - General Medicine
- Human Anatomy
- Biochemistry

CG | CBA | QBs | LMS | Help

General Physiology | Haematology | Nerve and Muscle Physiology | Gastro-intestinal Physiology

Id	Description	Teaching-Learning	AM 1	AM 2	AM 3
PY1.1	Describe the structure	Lecture and Small Group	Written	Viva Voce	
PY1.2	Describe and discuss the	Lecture and Small Group	Written	Viva Voce	
PY1.3	Describe intercellular	Lecture and Small Group	Written	Viva Voce	
PY1.4	Describe apoptosis –	Lecture and Small Group	Written	Viva Voce	

Academic Governance Dashboard for Teacher

Dr. Hemant

- Dashboard
- Physiology
  - Competencies
  - Teaching-Learning Methods
  - Assessment Methods
  - Integration
  - General Medicine
- Human Anatomy
- Biochemistry

CG | CBA | QBs | LMS | Help

General Physiology | Haematology | Nerve and Muscle Physiology | Gastro-intestinal Physiology

Id	Description	Teaching-Learning	AM 1	AM 2	AM 3
PY1.1	Describe the structure	Lecture and Small Group	Written	Viva Voce	
PY1.2	De		ten	Viva Voce	
PY1.3	De		ten	Viva Voce	
PY1.4	De		ten	Viva Voce	

Time-Table



Competency Based Medical Education

Dr. Hemant 

- Dashboard
- Physiology
  - Competencies
  - Teaching-Learning Methods
  - Assessment Methods
  - Integration
  - General Medicine
- Human Anatomy
- Biochemistry

CG | CBA | QBs | LMS | Help

General Physiology

Numb	Type	Assessment	Attempt date	duration	Status
1	Written	Parts of Mitochondrea	12/5/20	30	Complete
2	Viva	Intercellular communication	12/7/20	30	In Progress
3	Logbook	Transport mechanism across	12/12/20	-	Not Started

Competency Based Medical Education

Dr. Hemant

- Dashboard
- Physiology
  - Competencies
  - Teaching-Learning Methods
  - Assessment Methods
  - Integration
  - General Medicine
- Human Anatomy
- Biochemistry

CG | CBA | QBs | LMS | Help

Previous Student Next Student

Assessments and Activities > Normal Respiratory System

You are grading the logbook of Ganesh Iyer

Grade using Rubric

4.1 : Examination of the Respiratory System in normal persons

4.1.1 : Attend teaching session

☑ Mark completed

4.1..2: Attend practical session

☑ Mark completed

4.1..3: Review video

☐ Mark completed

4.1..4: Demonstrate examinatory of respiratory system

☑ Mark completed



Respiratory exa

4.1..5: Interpret a set of patterns

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud

Competency Based Medical Education

Dr. Hemant



Dashboard

Physiology

- Competencies
- Teaching-Learning Methods
- Assessment Methods
- Integration
- General Medicine

Human Anatomy

Biochemistry

CG | CBA | QBs | LMS | Help

Assessments and Activities > Normal Respiratory System

Previous Student | Next Student

Grade using rubric

PY6.8 | PY6.9 | PY6.10

4.1.4 Demonstrate

Demonstrate the correct techinque to perform & interpret Spirometry

Criteria	K	KH	SH	P
Lorem ipsum dolor sit amet	Lorem	Lorem	Lorem	Lorem ipsum
Lorem ipsum dolor sit amet	Lorem	Lorem	Lorem	Lorem ipsum

- (•) Knows
- ( ) Knows How
- ( ) Shows How

Add explanation

( ) Below ( ) Meets ( ) Exceeds

( ) Repeat ( ) Remedial ( ) Complete

Add comment here

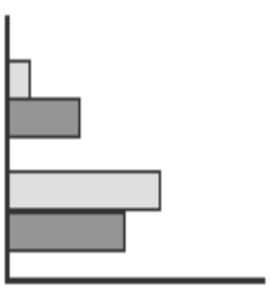
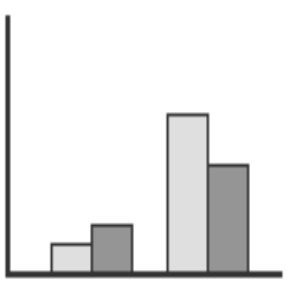
Competency Based Medical Education

Dr. Hemant

- Dashboard
- Physiology
  - Competencies
  - Teaching-Learning Methods
  - Assessment Methods
  - Integration
  - General Medicine
- Human Anatomy
- Biochemistry

CG | CBA | QBs | LMS | Help

Assessments and Activities > Transport Mechanism Across Membrane

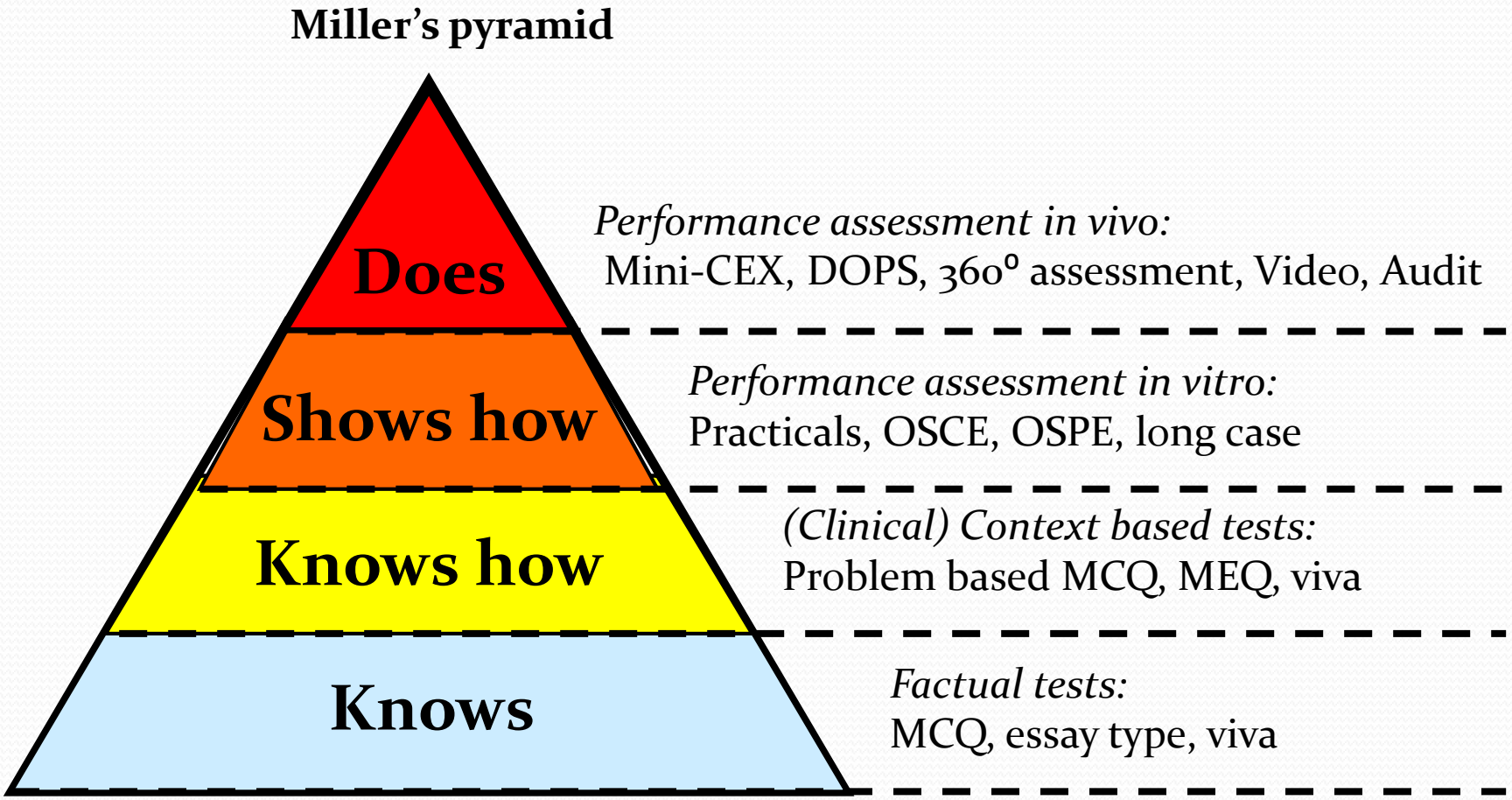



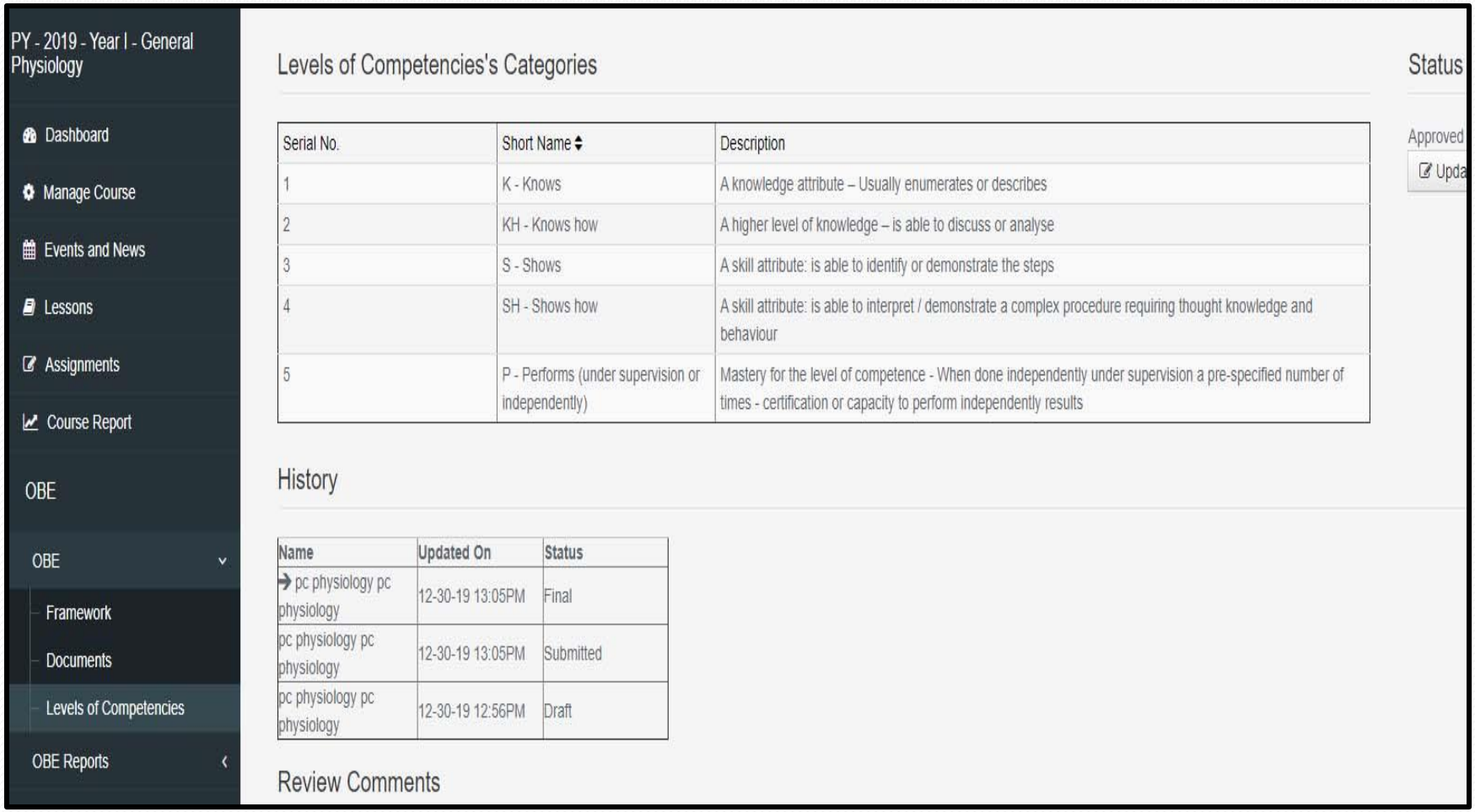


Nu	Name	Start date	end date	duration	Repeat	Status	Perf	Decision
24	Shama Patil	12/5 12:00	12/5 12:25	25	1	Graded	15/20	Complete
24	Ganesh Iyer	12/5 12:00	12/5 12:30	30	1	Graded	5/20	Remedial
213	Ramnath Guha	12/5 12:00	12/5 12:30	30	1	Graded	10/20	Repeat
38	Hamid Ansari	12/5 12:00	12/5 12:30	30	1	Graded	18/20	Complete

What else can be added

Differing levels for different levels of learners

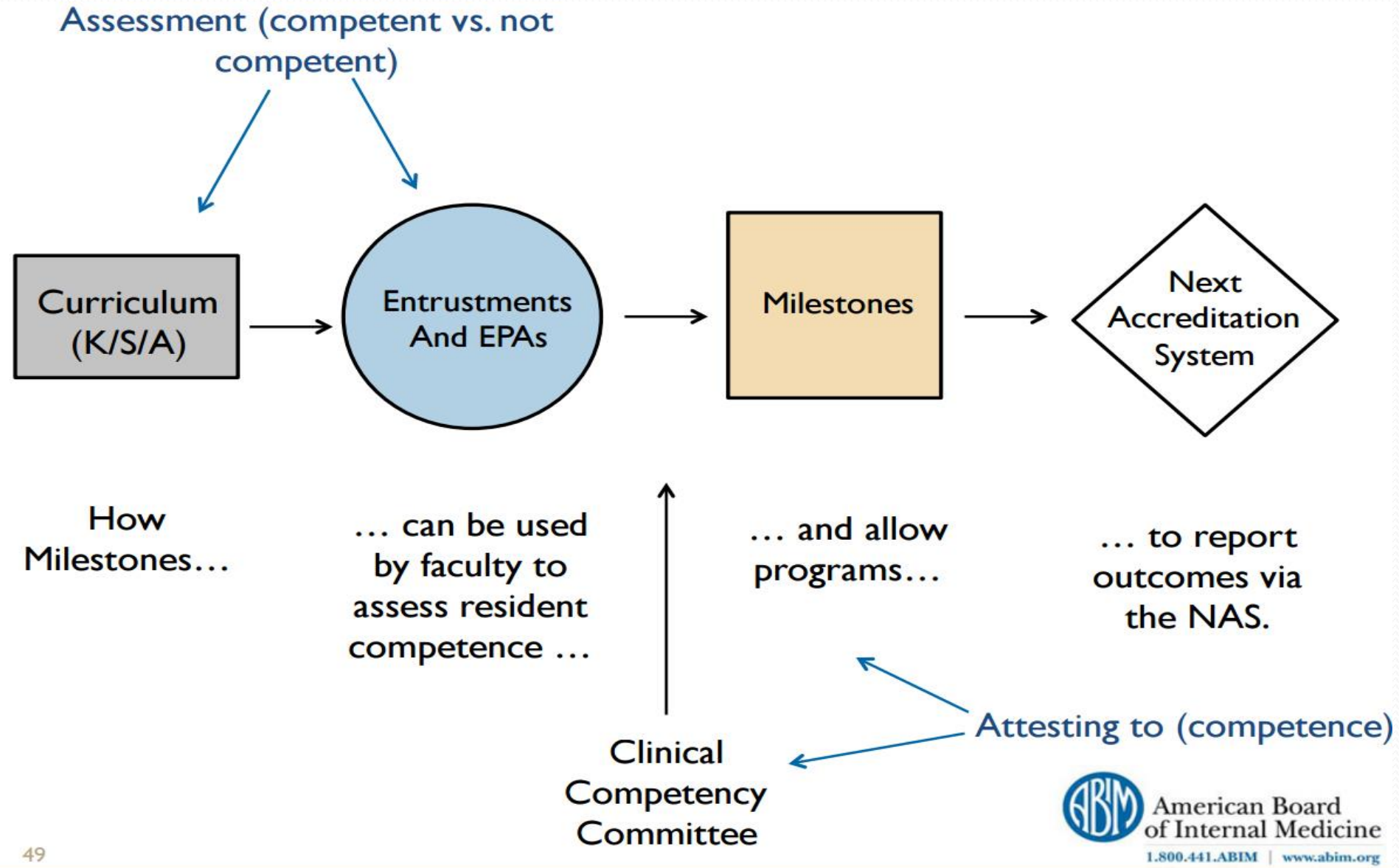



PY - 2019 - Year I - General Physiology
Dashboard
Manage Course
Events and News
Lessons
Assignments
Course Report
OBE
OBE
Framework
Documents
Levels of Competencies
OBE Reports
Levels of Competencies's Categories
Status
Approved
Upda
Serial No.
Short Name
Description
1
K - Knows
A knowledge attribute – Usually enumerates or describes
2
KH - Knows how
A higher level of knowledge – is able to discuss or analyse
3
S - Shows
A skill attribute: is able to identify or demonstrate the steps
4
SH - Shows how
A skill attribute: is able to interpret / demonstrate a complex procedure requiring thought knowledge and behaviour
5
P - Performs (under supervision or independently)
Mastery for the level of competence - When done independently under supervision a pre-specified number of times - certification or capacity to perform independently results
History
Name
Updated On
Status
pc physiology pc physiology
12-30-19 13:05PM
Final
pc physiology pc physiology
12-30-19 13:05PM
Submitted
pc physiology pc physiology
12-30-19 12:56PM
Draft
Review Comments

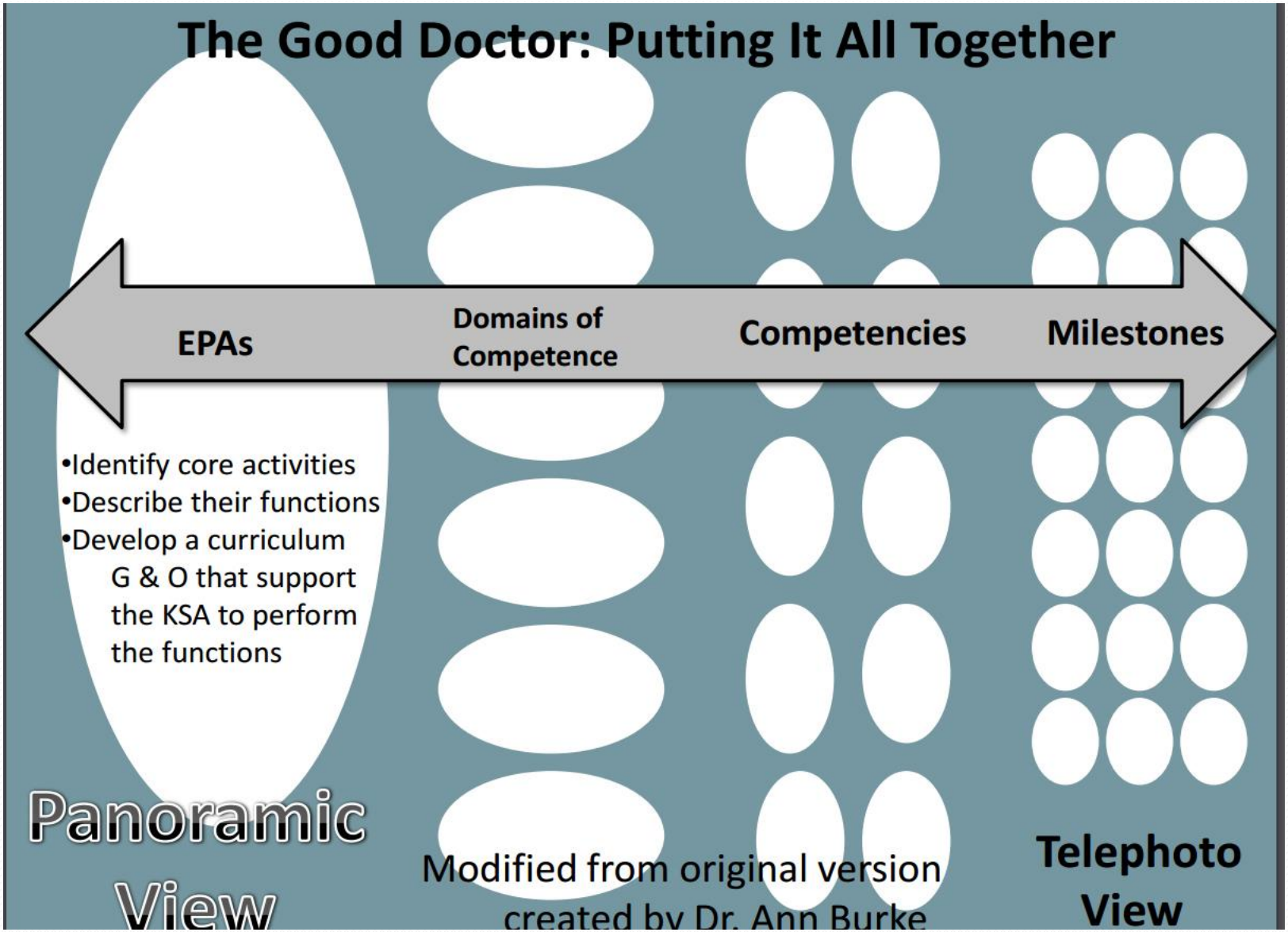
Milestones are defined for UGS?





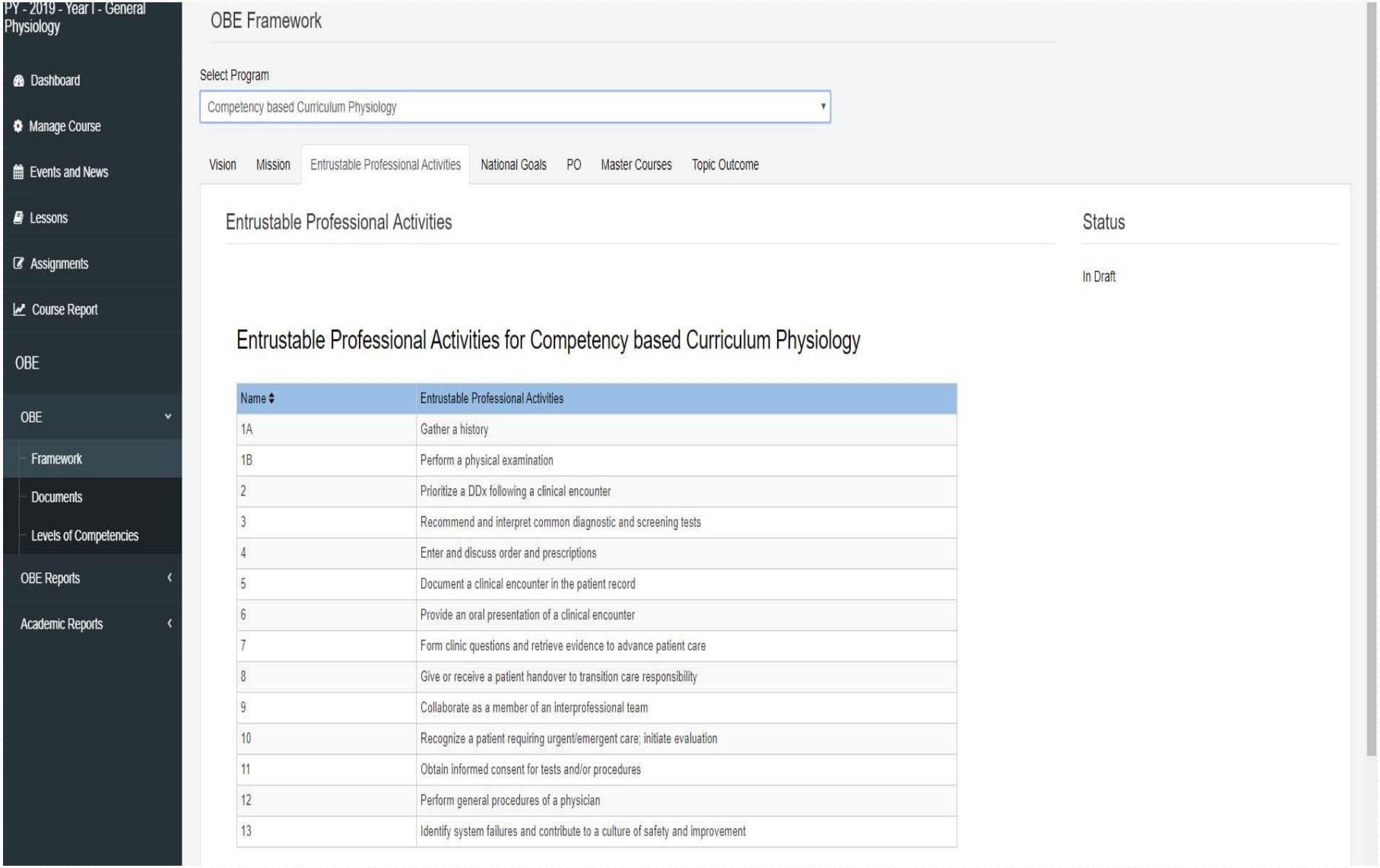


American Board of Internal Medicine
1.800.441.ABIM | www.abim.org


The Good Doctor: Putting It All Together
EPAs
Domains of Competence
Competencies
Milestones
•Identify core activities
•Describe their functions
•Develop a curriculum
G & O that support the KSA to perform the functions
Panoramic View
Modified from original version created by Dr. Ann Burke
Telephoto View

The Entrustable Professional Activity (EPA) can we use for IMG

- Start with concrete clinical activities, then link these to core competencies/milestones (or roadblocks…)
- Value individual differences
- Incorporate professional judgment of competence by seasoned clinicians
- Make deliberate “decisions of entrustment” for concrete “entrustable” activities
- Build a collection (portfolio) to document competence


PY - 2019 - Year I - General Physiology
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OBE
OBE
Framework
Documents
Levels of Competencies
OBE Reports
Academic Reports
OBE Framework
Select Program
Competency based Curriculum Physiology
Vision
Mission
Entrustable Professional Activities
National Goals
PO
Master Courses
Topic Outcome
Entrustable Professional Activities
Status
In Draft
Entrustable Professional Activities for Competency based Curriculum Physiology
Name
Entrustable Professional Activities
1A
Gather a history
1B
Perform a physical examination
2
Prioritize a DDx following a clinical encounter
3
Recommend and interpret common diagnostic and screening tests
4
Enter and discuss order and prescriptions
5
Document a clinical encounter in the patient record
6
Provide an oral presentation of a clinical encounter
7
Form clinic questions and retrieve evidence to advance patient care
8
Give or receive a patient handover to transition care responsibility
9
Collaborate as a member of an interprofessional team
10
Recognize a patient requiring urgent/emergent care; initiate evaluation
11
Obtain informed consent for tests and/or procedures
12
Perform general procedures of a physician
13
Identify system failures and contribute to a culture of safety and improvement

Artificial Intelligence Systems In Medical Education

- AI systems in Curriculum
- AI systems in Academic Goverence
- AI systems Dynamic Real time assessment of student
- AI systems in Self Directed Learning
- AI system In Assessment
- AI systems for CPE of CBME
- AI systems in Resource Management

Aim Of AI system in Assessment

- To create a question paper based on designated Assessment parameters from a validated Question bank
- Multiple question papers need to be created based on Difficulty index and differentiation index
- Graded question paper, Progressive Difficult questions
- To follow routine procedure of Setting up a question paper
- Each exam center can have a different set of question paper so that problem of leakage to be addressed
- To use advanced methods like scenario based question / Real time patient scenario
- Question bank should have all types of assessment methods to suitably address desired competency

Creating Rubric for Assessments

Title Hydraulic Mechanics Rubric

Description Description

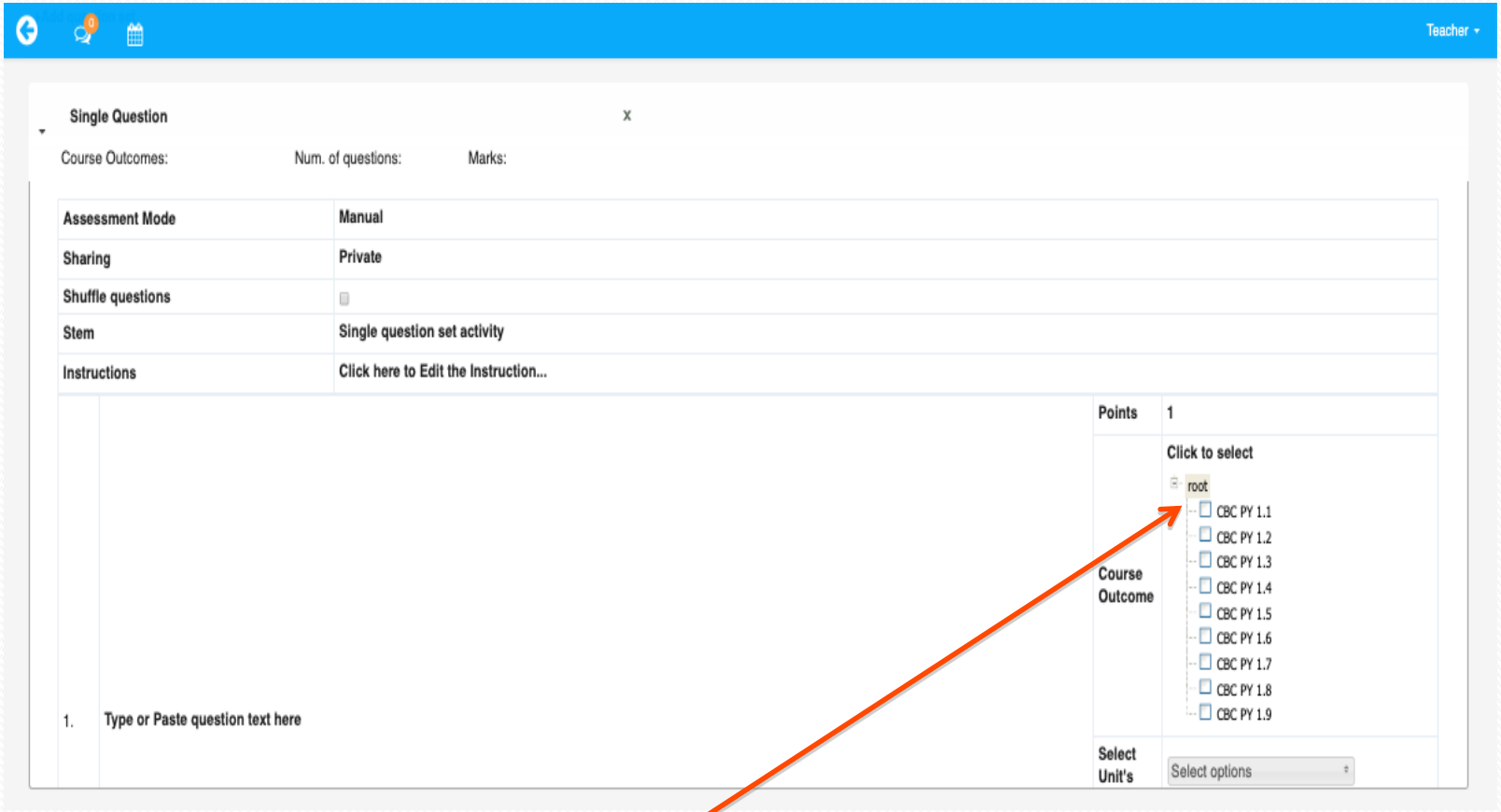
Criteria

Criteria	Weightage (%)	Exceeds Expectation 92 - 100 %	Meets Expectation 72 - 91 %	Below Expectation 48 - 71 %	Below Expectation 0 - 47 %
		Lower Range:**91**	Lower Range:**72**	Lower Range:**48**	Lower Range:**0**
Writing Journal	40	Completed with Neat diagrams, observations and correct answers of post lab questions and conclusion	Fairly completed with neat diagrams, observations and correct answers of post lab questions and conclusions	Either of diagram / post lab questions is incomplete Completed after guidance from the Professor	Partially incomplete write-ups
Performance in lab	40	Designs and simulates independently with clear concepts	Designs and simulates independently but after trial and error	Designs and simulates with help of Professor	Not able to design and simulate even after help
Viva	20	All the concepts regarding the experiment are clear	All the concepts regarding the experiment are partially clear	All the concepts regarding the experiment are not clear	Very bad fundamental knowledge.

Difficulty index and differentiation index van be used in addition

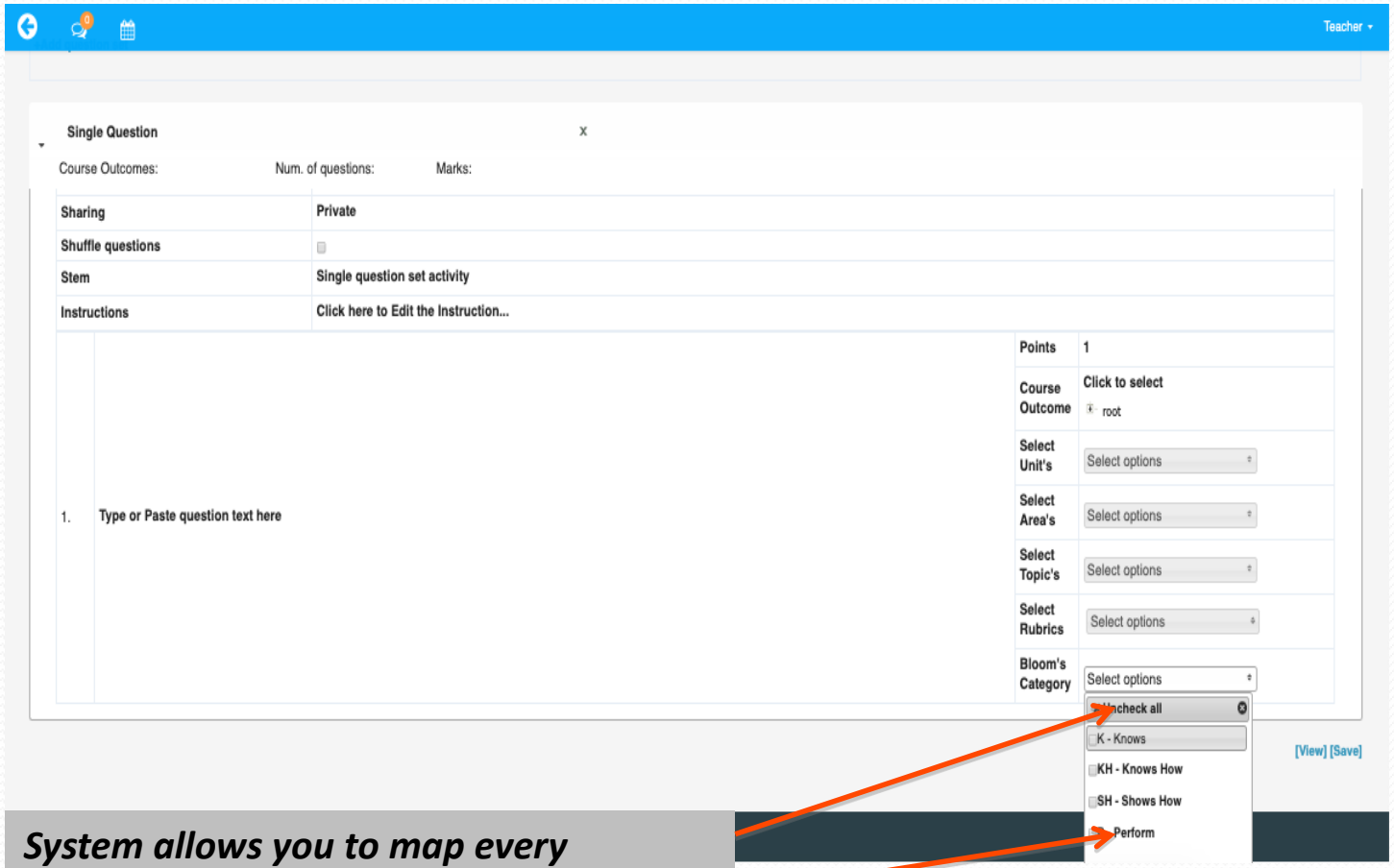
Calculation of Difficulty index and differentiation index of past question papers designing New Question paper using AI systems

Mapping Questions to Competencies



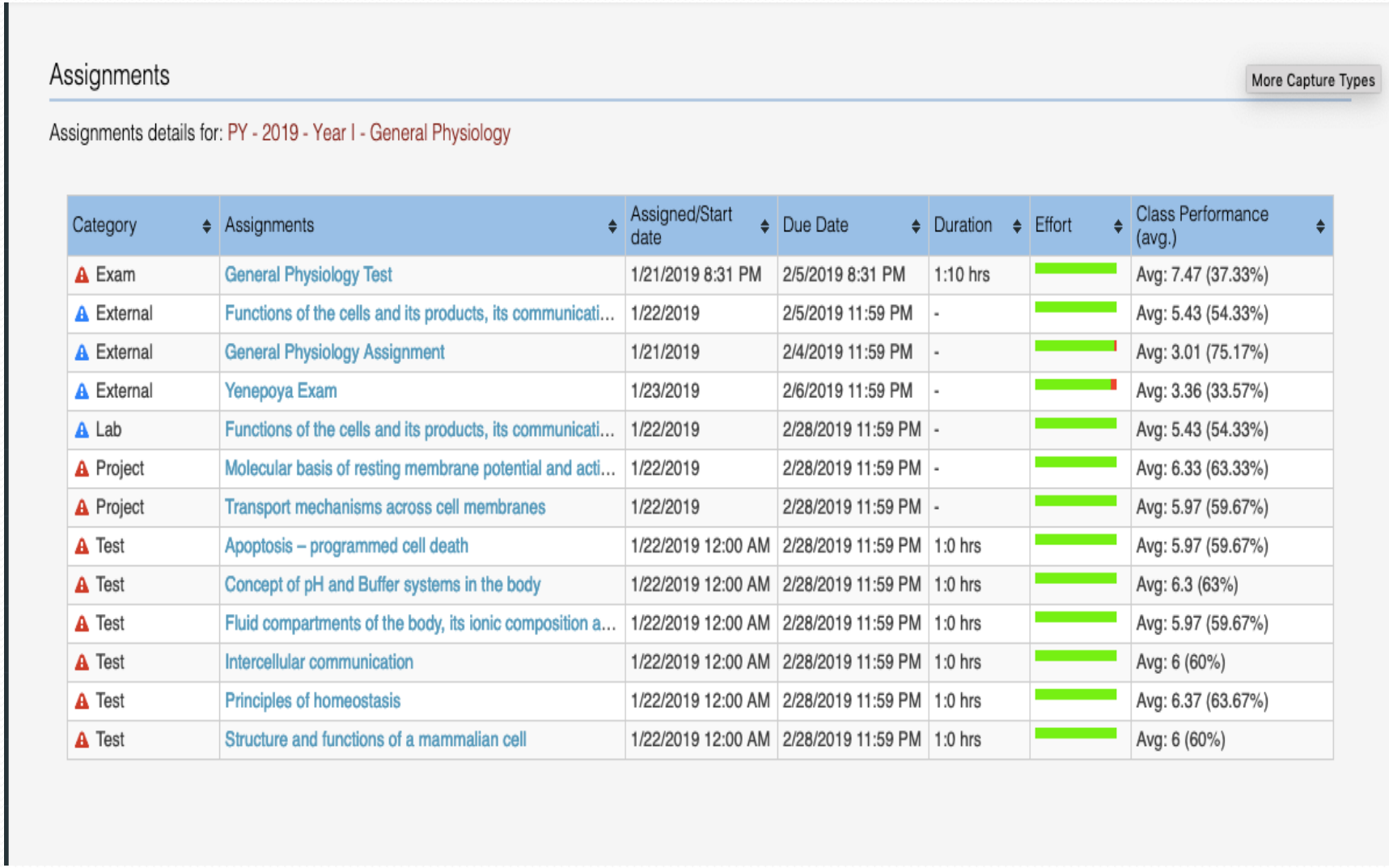
System allows you to map every question to Competencies

Mapping Rubrics and Level of Competency



System allows you to map every question to Rubrics and level of Competencies

Mapping Rubrics and Level of Competency



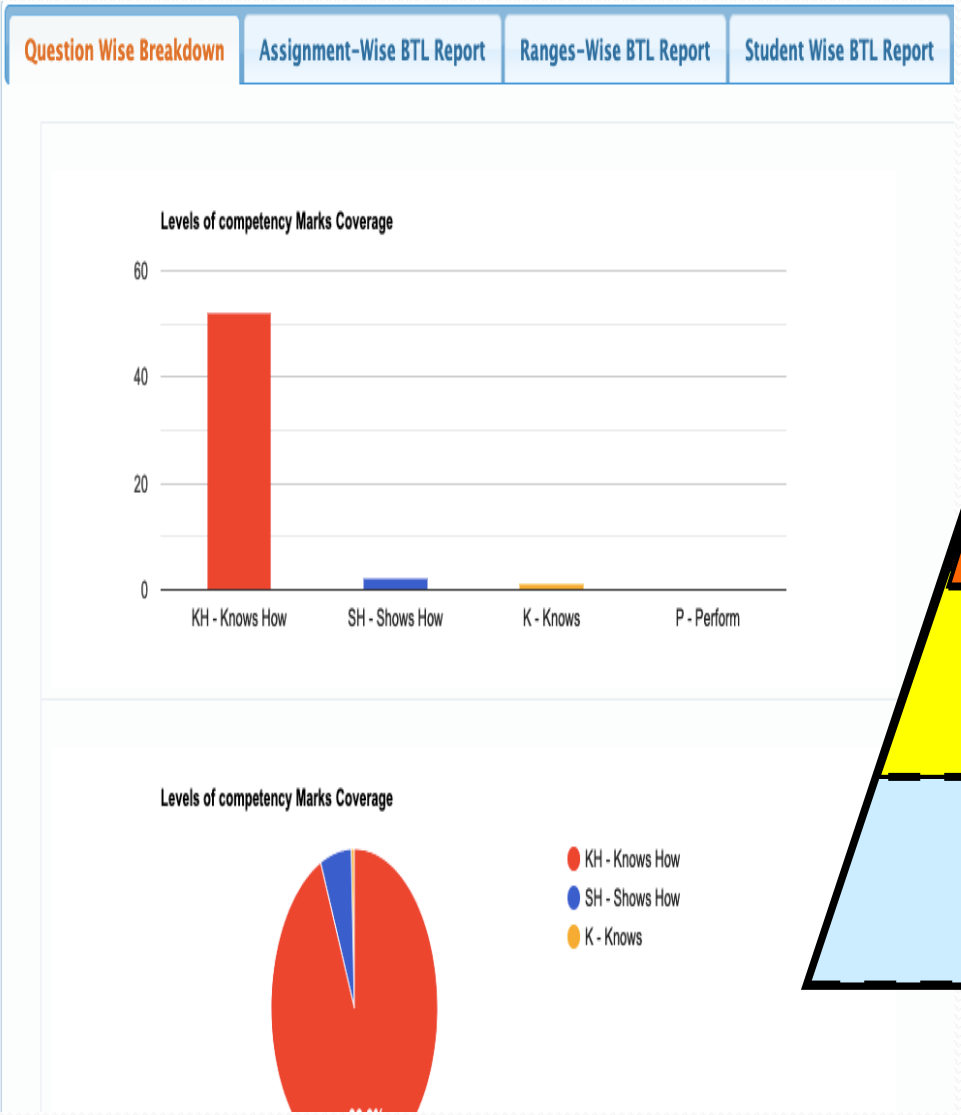
Assignments

More Capture Types

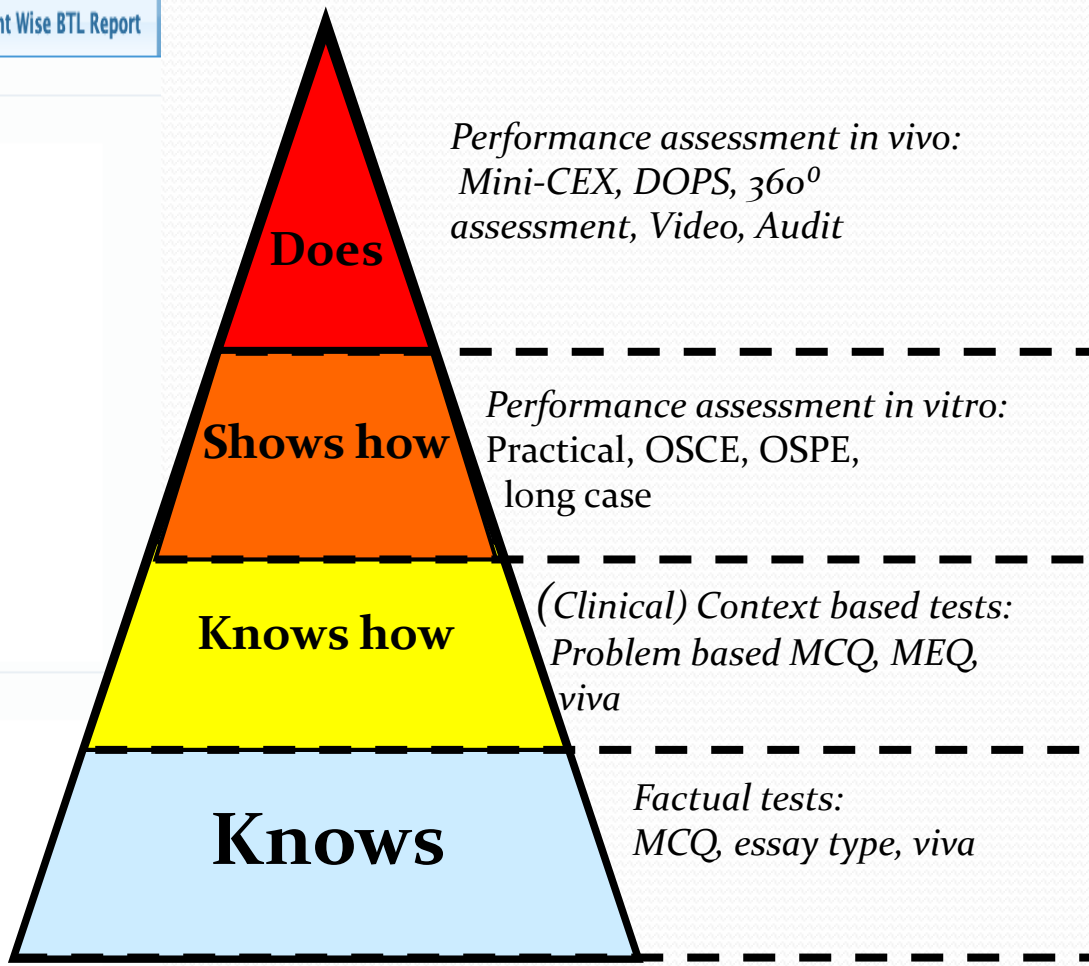
Assignments details for: PY - 2019 - Year I - General Physiology

Category	Assignments	Assigned/Start date	Due Date	Duration	Effort	Class Performance (avg.)
Exam	General Physiology Test	1/21/2019 8:31 PM	2/5/2019 8:31 PM	1:10 hrs		Avg: 7.47 (37.33%)
External	Functions of the cells and its products, its communicati...	1/22/2019	2/5/2019 11:59 PM	-		Avg: 5.43 (54.33%)
External	General Physiology Assignment	1/21/2019	2/4/2019 11:59 PM	-		Avg: 3.01 (75.17%)
External	Yenepoya Exam	1/23/2019	2/6/2019 11:59 PM	-		Avg: 3.36 (33.57%)
Lab	Functions of the cells and its products, its communicati...	1/22/2019	2/28/2019 11:59 PM	-		Avg: 5.43 (54.33%)
Project	Molecular basis of resting membrane potential and acti...	1/22/2019	2/28/2019 11:59 PM	-		Avg: 6.33 (63.33%)
Project	Transport mechanisms across cell membranes	1/22/2019	2/28/2019 11:59 PM	-		Avg: 5.97 (59.67%)
Test	Apoptosis – programmed cell death	1/22/2019 12:00 AM	2/28/2019 11:59 PM	1:0 hrs		Avg: 5.97 (59.67%)
Test	Concept of pH and Buffer systems in the body	1/22/2019 12:00 AM	2/28/2019 11:59 PM	1:0 hrs		Avg: 6.3 (63%)
Test	Fluid compartments of the body, its ionic composition a...	1/22/2019 12:00 AM	2/28/2019 11:59 PM	1:0 hrs		Avg: 5.97 (59.67%)
Test	Intercellular communication	1/22/2019 12:00 AM	2/28/2019 11:59 PM	1:0 hrs		Avg: 6 (60%)
Test	Principles of homeostasis	1/22/2019 12:00 AM	2/28/2019 11:59 PM	1:0 hrs		Avg: 6.37 (63.67%)
Test	Structure and functions of a mammalian cell	1/22/2019 12:00 AM	2/28/2019 11:59 PM	1:0 hrs		Avg: 6 (60%)

Questions Coverage



Miller's pyramid



Competency Levels



Topic Outcome	Beginner Range 0 - 41 %	Developing Range 41 - 81 %	Proficient Range 81 - 100 %
CBC PY 1.1	75.00 (3)	25.00 (1)	0.00 (0)
CBC PY 1.2	75.00 (3)	25.00 (1)	0.00 (0)
CBC PY 1.3	57.14 (4)	0.00 (0)	42.86 (3)
CBC PY 1.4	66.67 (4)	33.33 (2)	0.00 (0)
CBC PY 1.5	50.00 (1)	50.00 (1)	0.00 (0)
CBC PY 1.6	0.00 (0)	50.00 (1)	50.00 (1)
CBC PY 1.7	0.00 (0)	50.00 (1)	50.00 (1)
CBC PY 1.8	50.00 (1)	50.00 (1)	0.00 (0)
CBC PY 1.9	50.00 (2)	50.00 (2)	0.00 (0)

Question-level analysis

Refresh

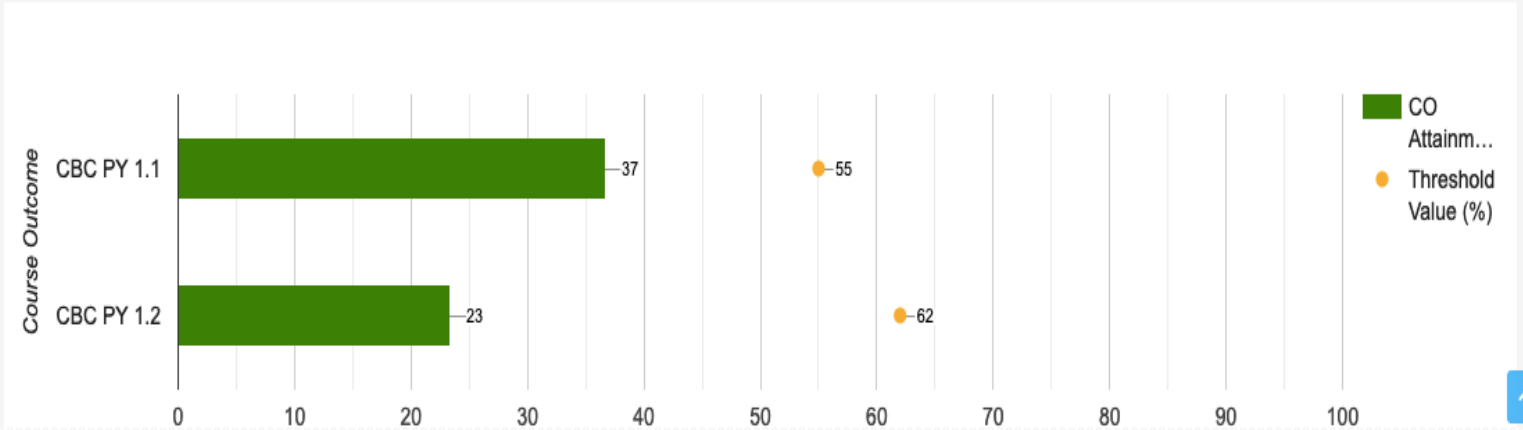
Questions	Course Outcomes	Rubrics	Blooms	Marks	Average	Standard Deviation	Max	Min	% Of Attem
Q1	CBC PY 1.1		SH - Shows How	5	2.47	1.81	5	0	63.33
Q2	CBC PY 1.2		SH - Shows How	5	2.47	1.81	5	0	63.33

More Capture Types

▸ Question-CO Analysis Report

▸ Area Of Weakness Report

Yenepoya Exam CO Attainment Chart



Topic-wise Analysis – for an assignment

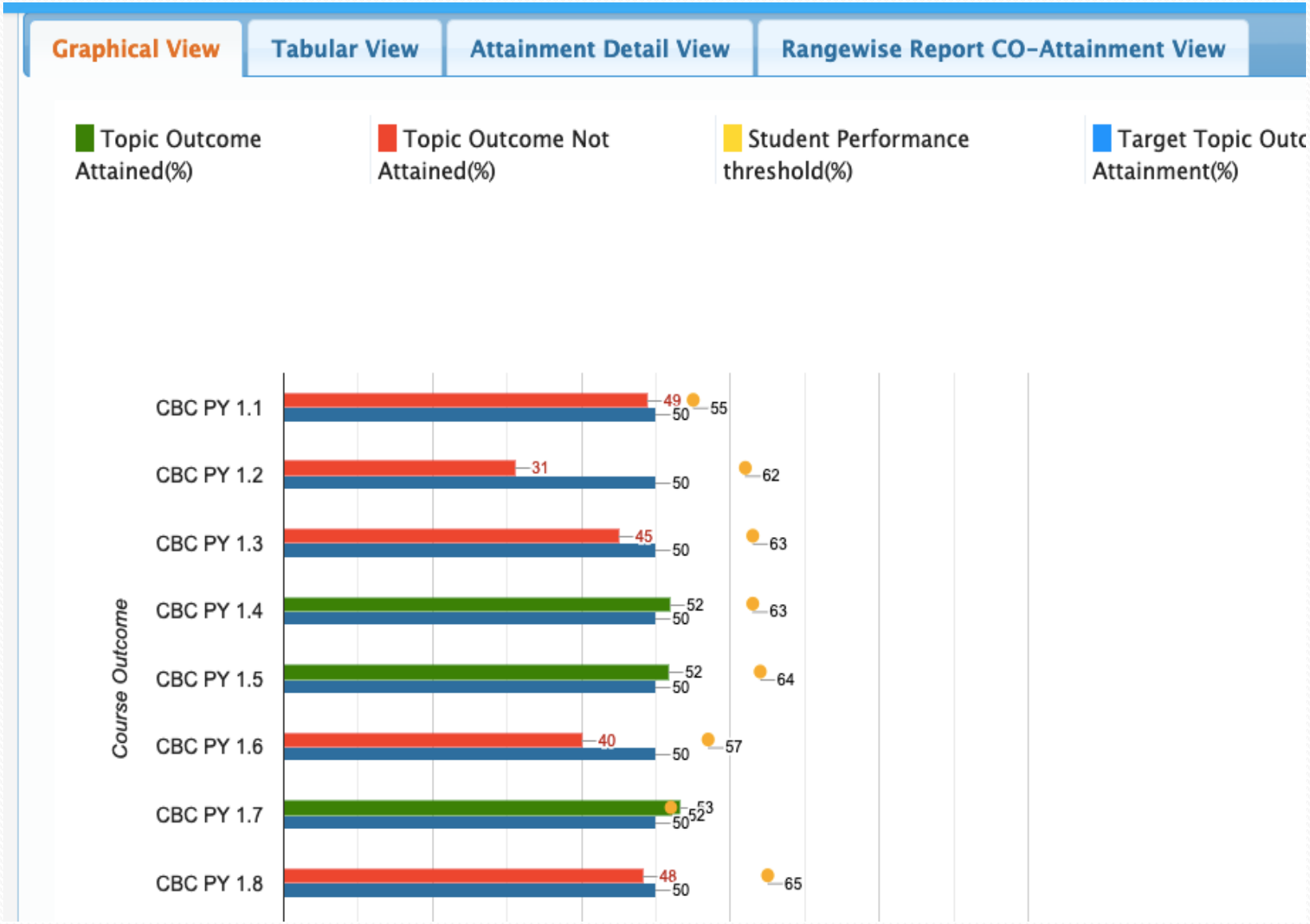
Question-Topic Outcome Analysis Report

More Capture Ty

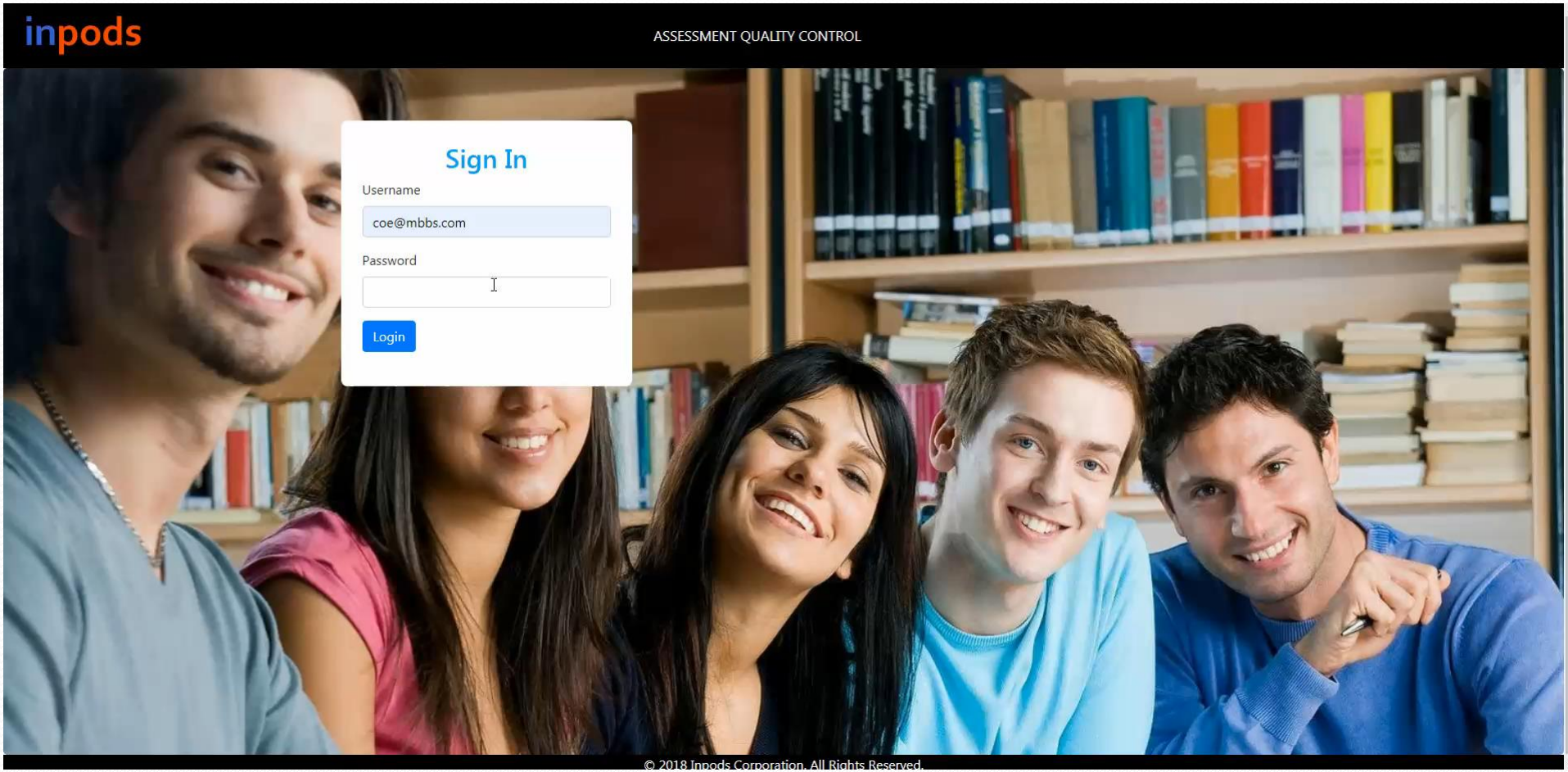
Click here to add Remedial Actions

Sr No.	Name of the student	Roll No	Cumulative Marks for CBC PY 1.1	Cumulative Marks for CBC PY 1.2
12	Student 12	12	5/5 (100.00 %)	0/5 (0.00 %)
21	Student 21	21	5/5 (100.00 %)	0/5 (0.00 %)
1	Student 1	1	4/5 (80.00 %)	0/5 (0.00 %)
11	Student 11	11	4/5 (80.00 %)	0/5 (0.00 %)
22	Student 22	22	4/5 (80.00 %)	0/5 (0.00 %)
24	Student 24	24	4/5 (80.00 %)	0/5 (0.00 %)
28	Student 28	28	4/5 (80.00 %)	3/5 (60.00 %)
10	Student 10	10	3/5 (60.00 %)	0/5 (0.00 %)
23	Student 23	23	3/5 (60.00 %)	0/5 (0.00 %)
25	Student 25	25	3/5 (60.00 %)	0/5 (0.00 %)
27	Student 27	27	3/5 (60.00 %)	4/5 (80.00 %)
14	Student 14	14	2/5 (40.00 %)	4/5 (80.00 %)
26	Student 26	26	2/5 (40.00 %)	5/5 (100.00 %)
13	Student 13	13	1/5 (20.00 %)	0/5 (0.00 %)
2	Student 2	2	0/5 (0.00 %)	0/5 (0.00 %)
3	Student 3	3	0/5 (0.00 %)	3/5 (60.00 %)

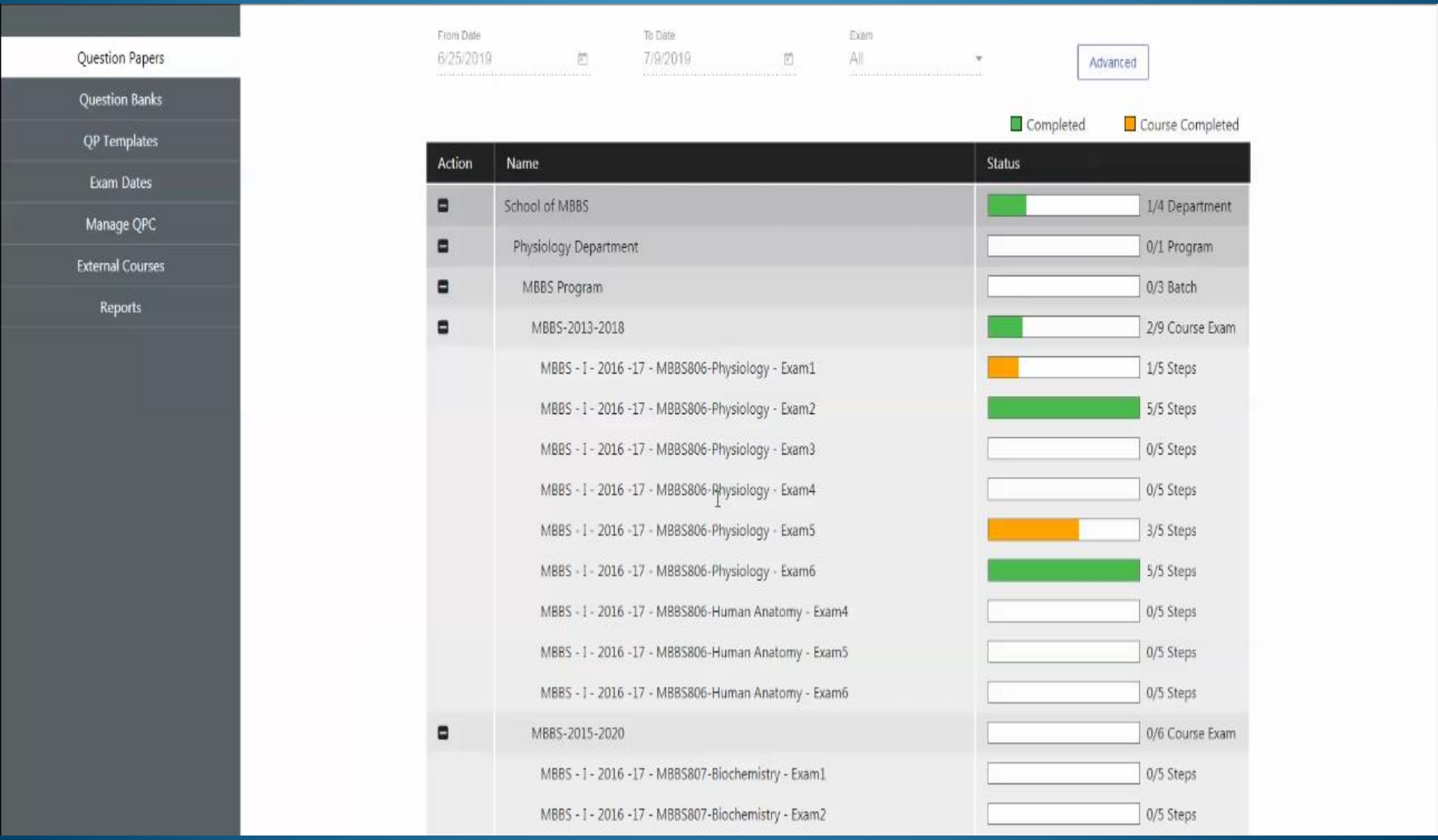
Topic Level Competencies Attainment



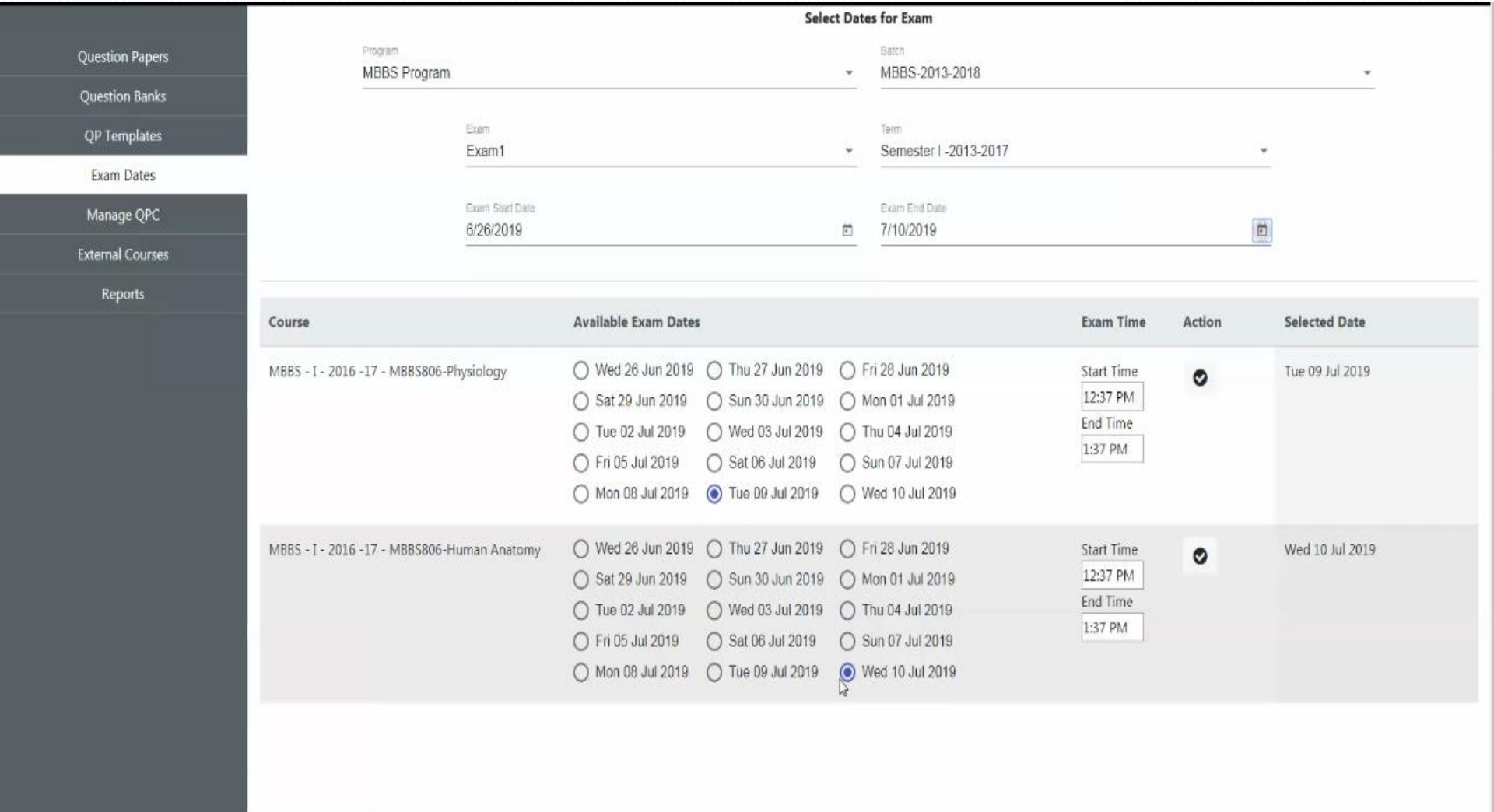
Question Paper Management System



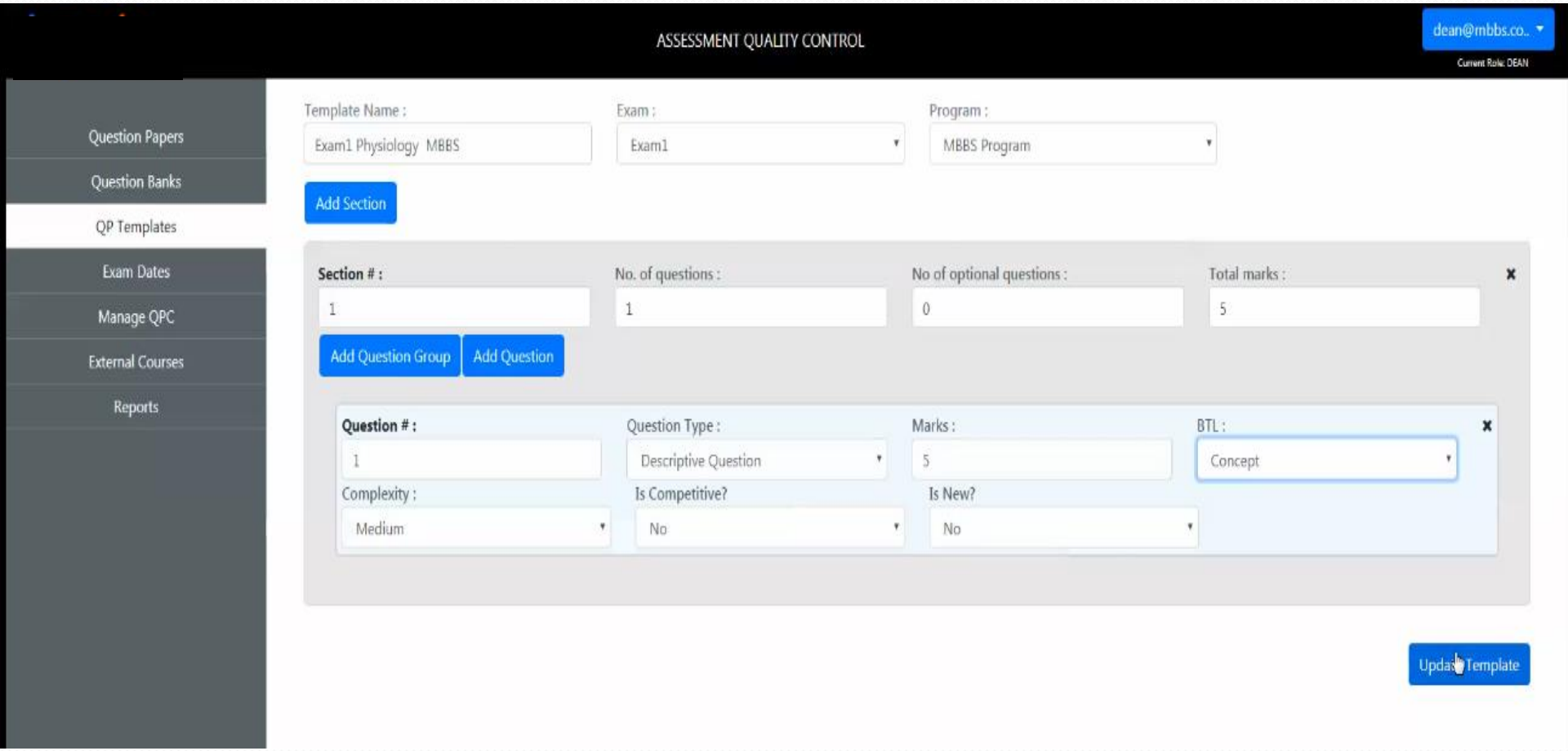
Dean's Login Status



Selection of Exam Date



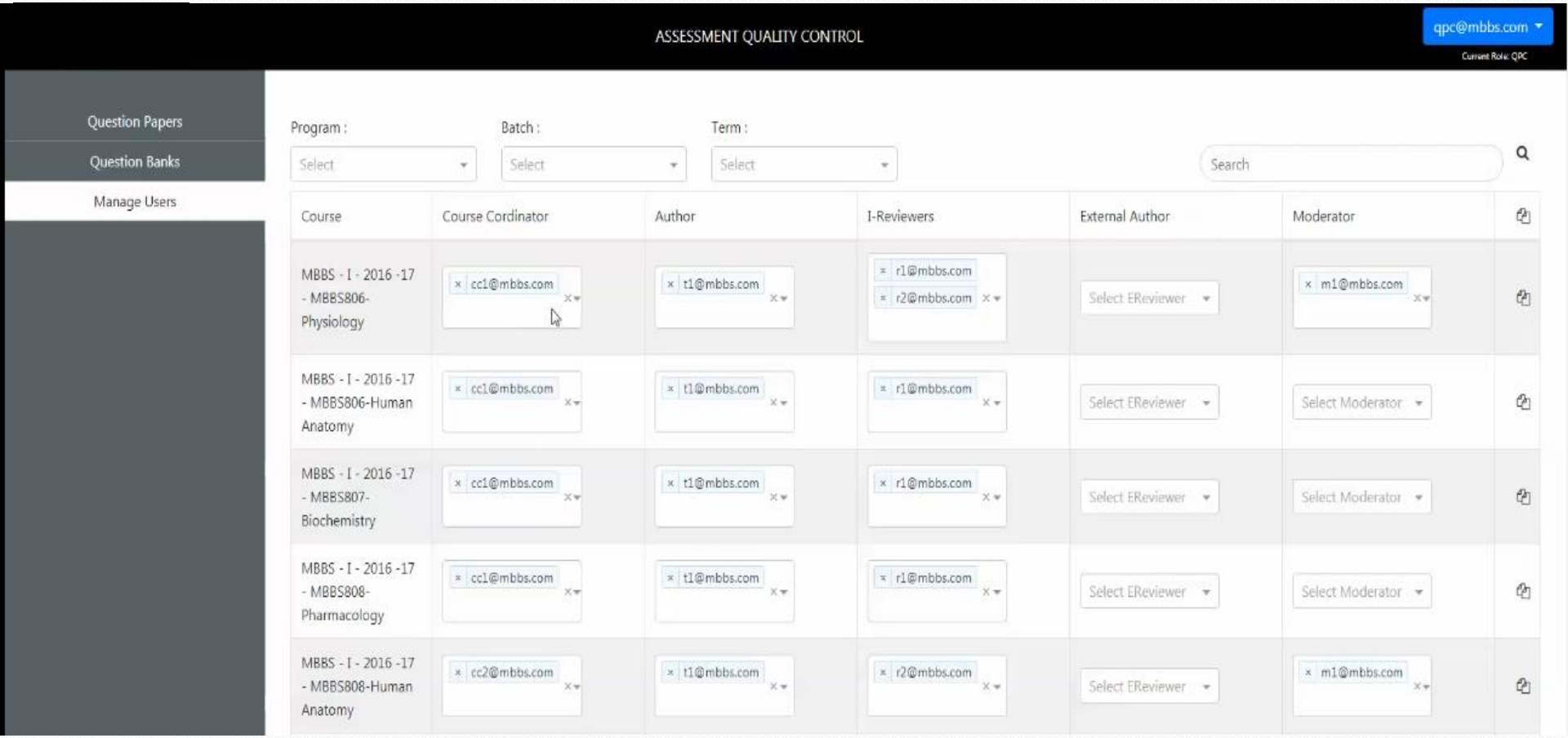
Creating an exam template



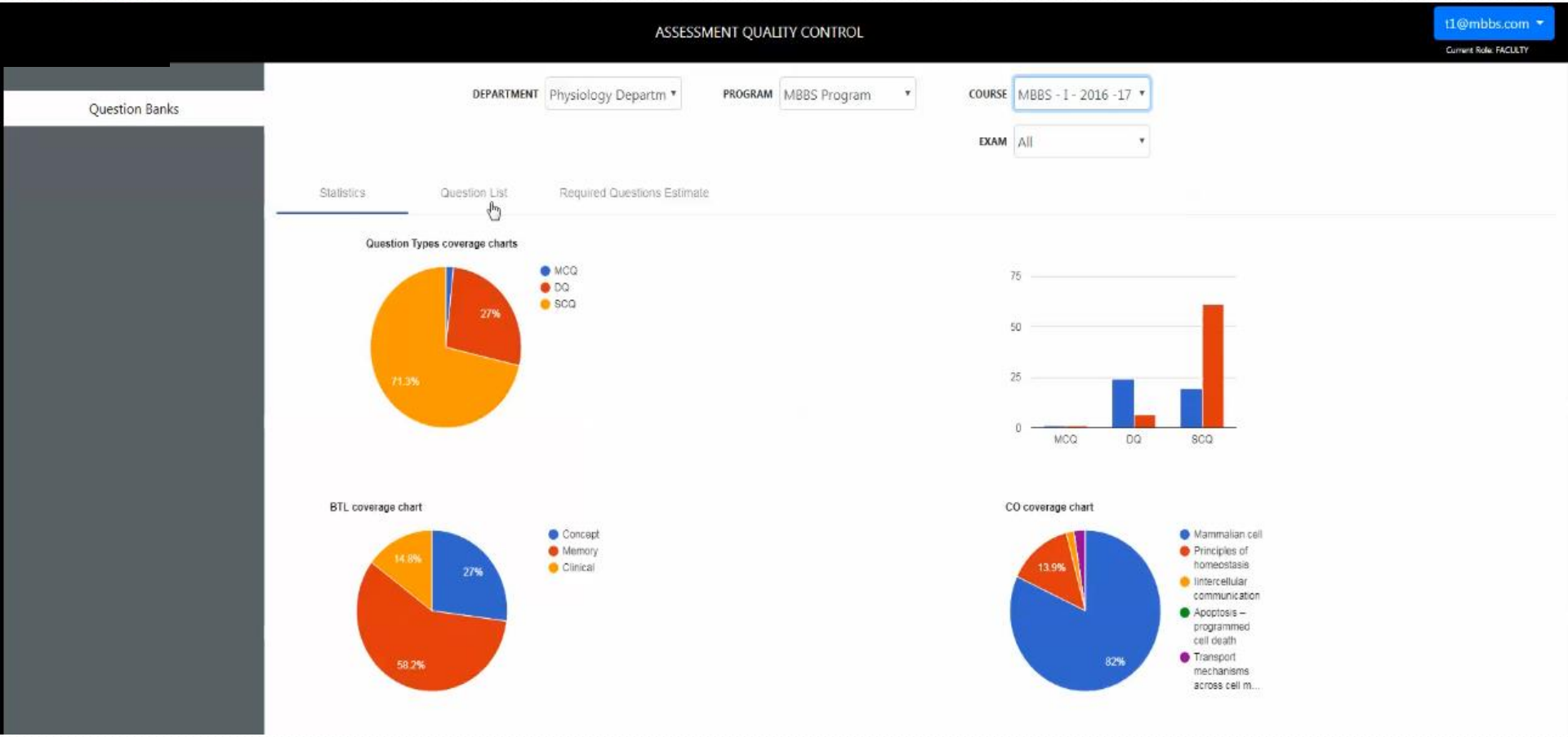
Status of Question Paper



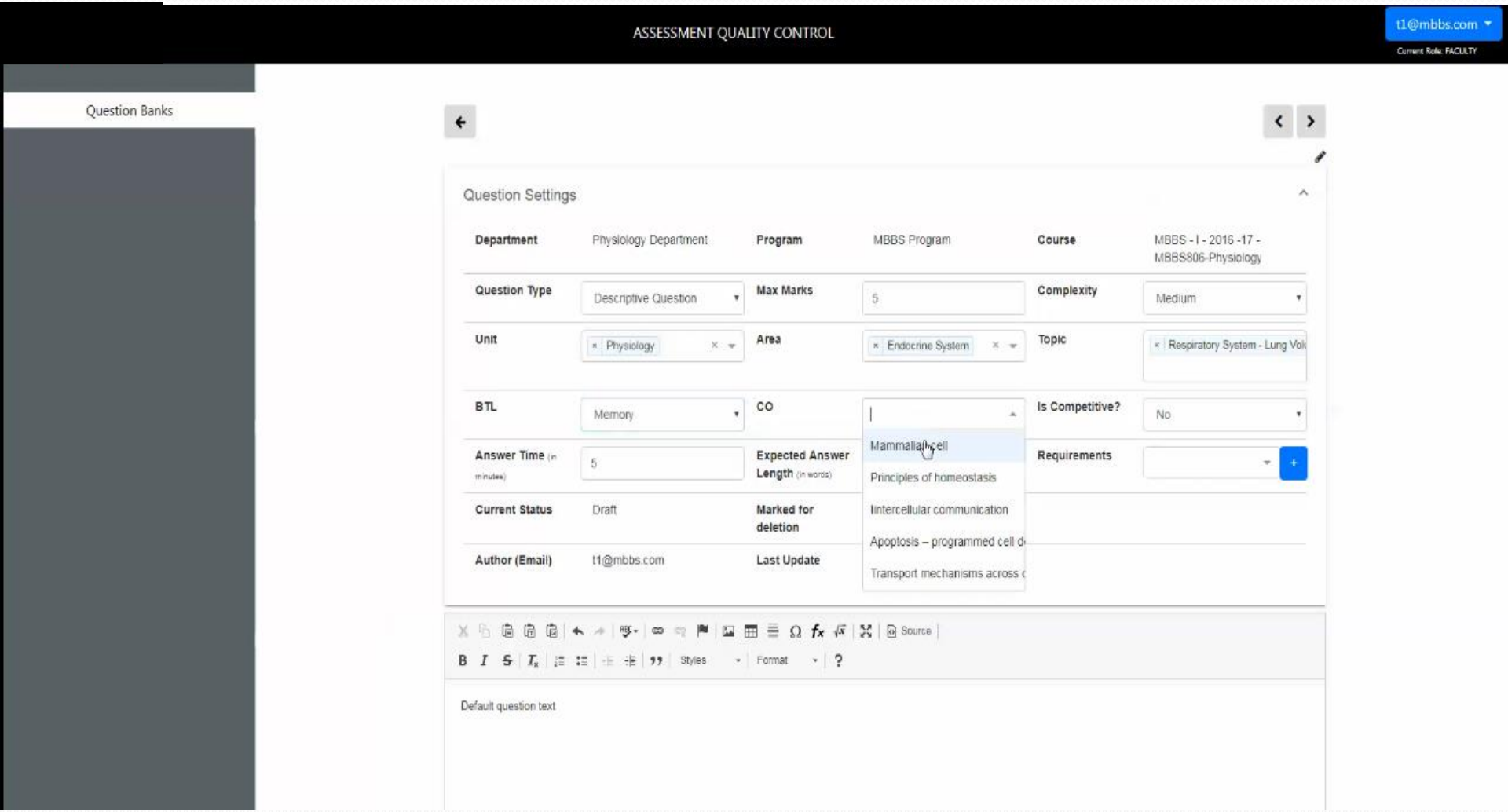
Mapping roles to the teachers



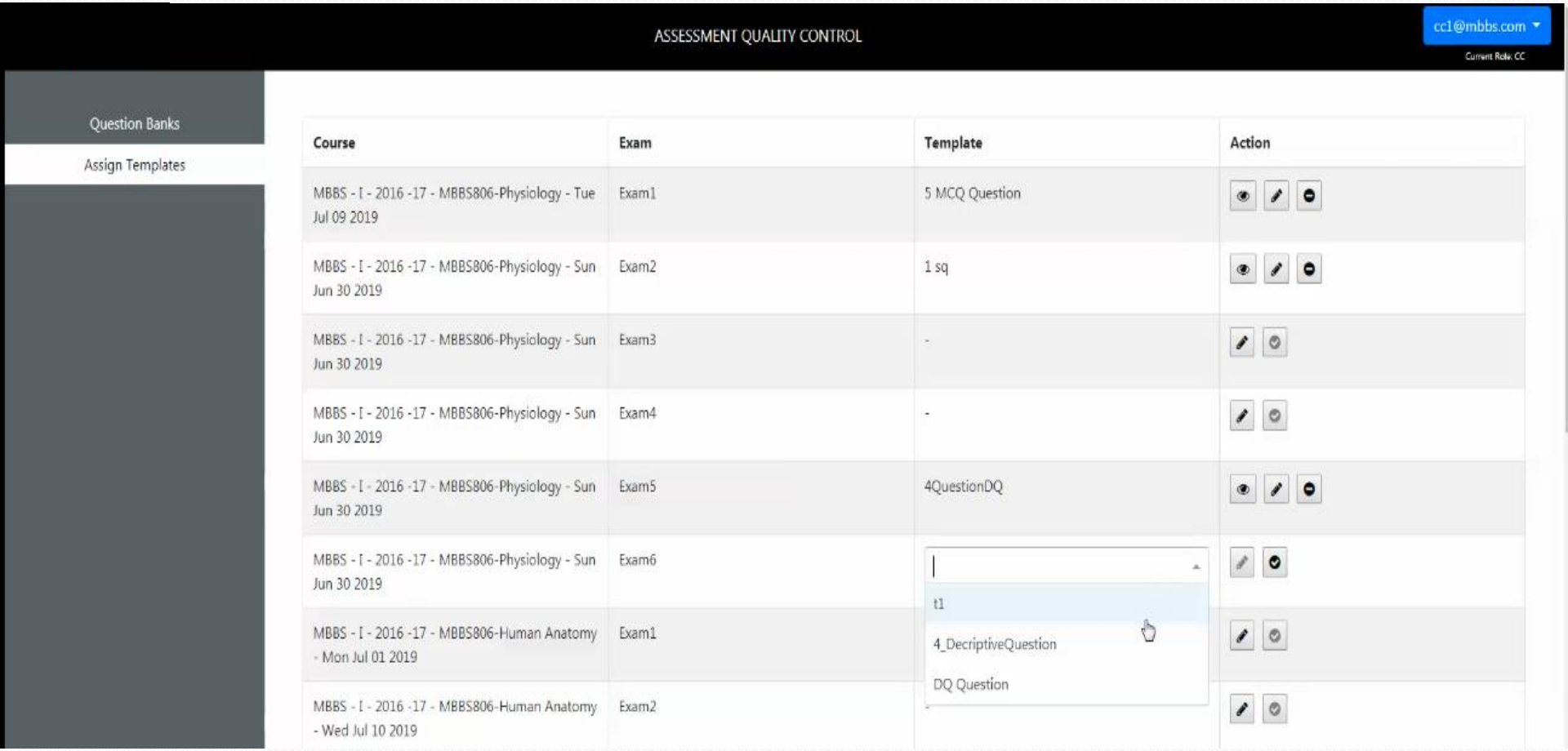
Teacher login – Question Bank statistics



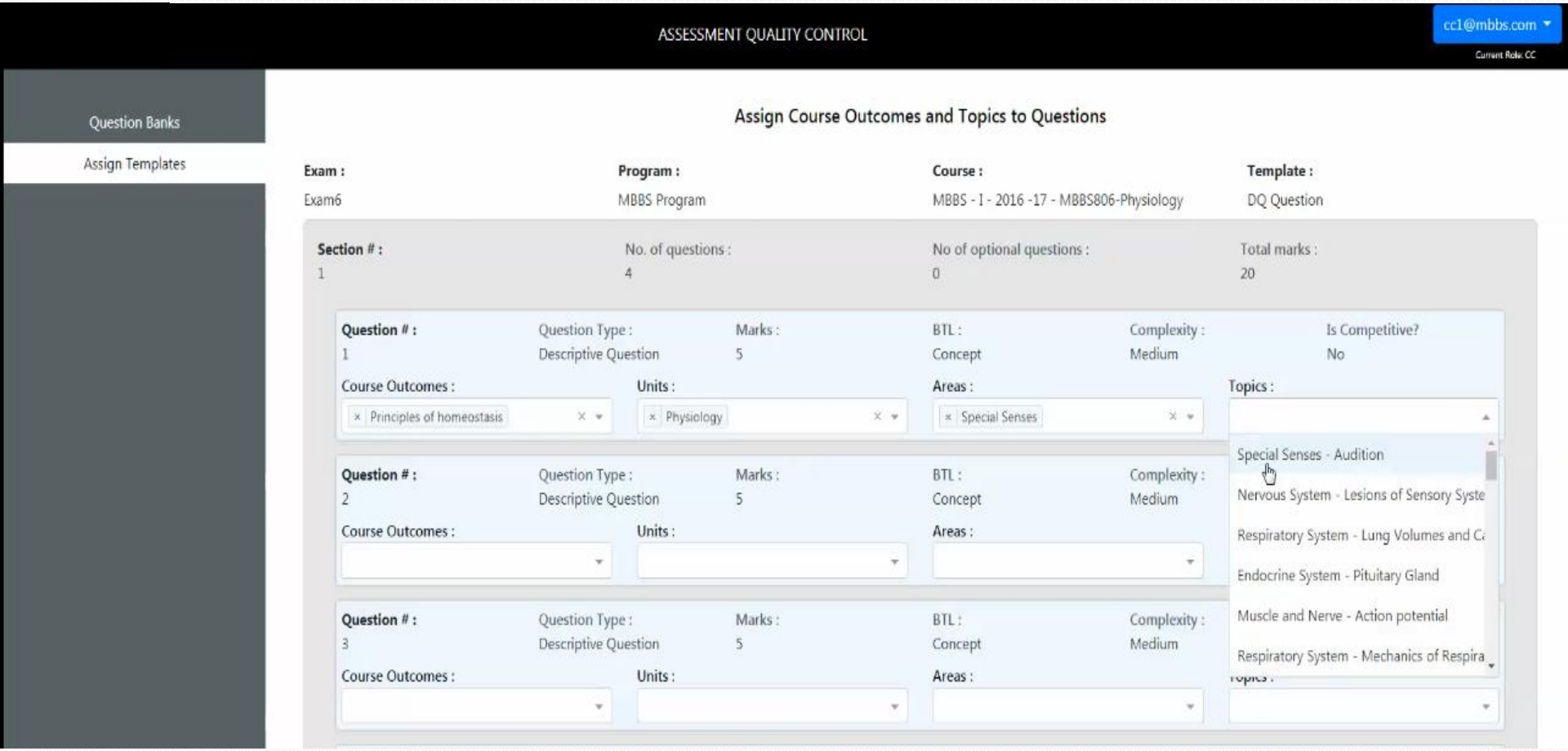
Addition of a new question



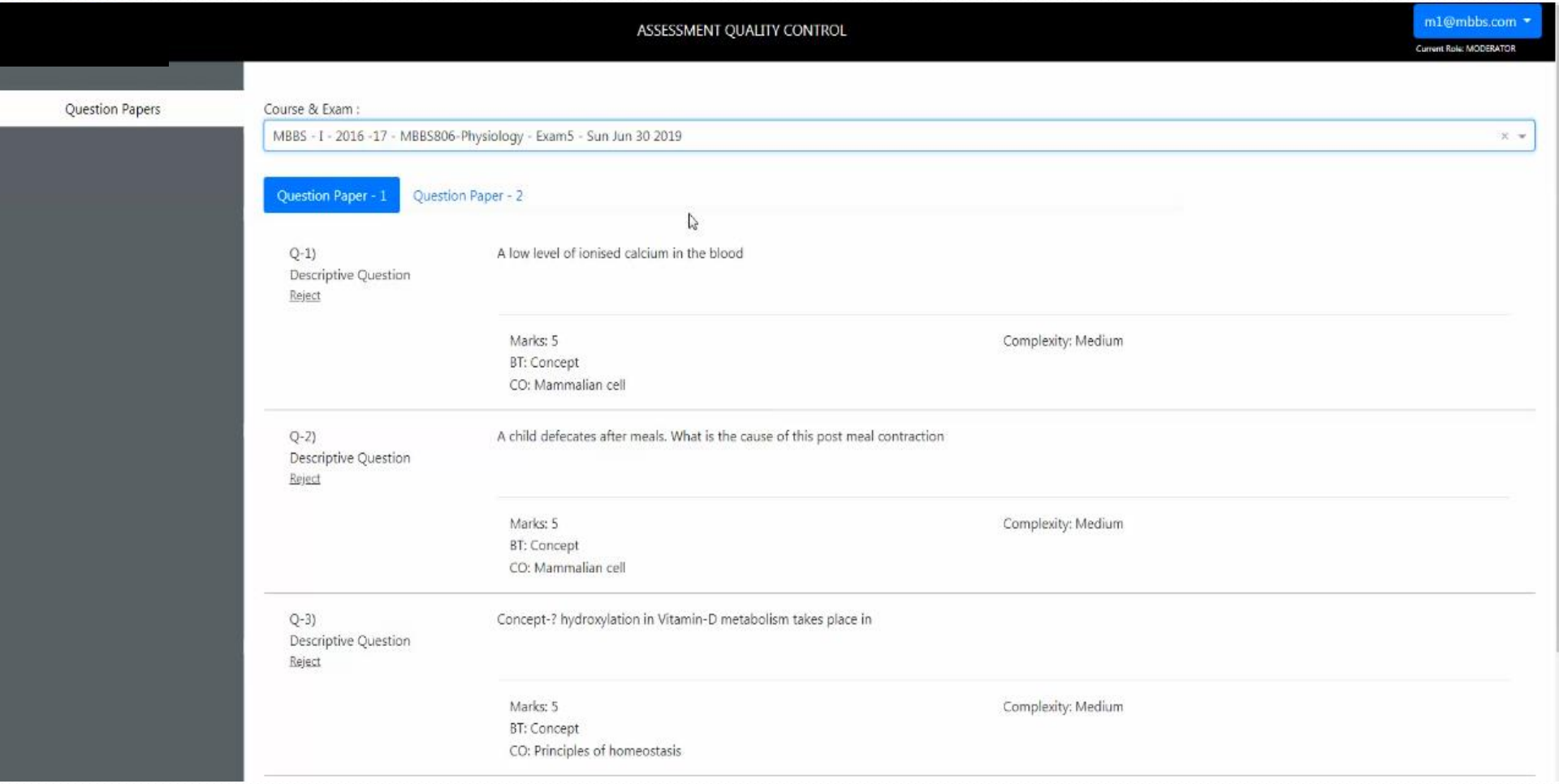
Course Coordinator Login – Assigning template to a course



Setting the question parameters



Moderator login – Question paper generated



Cont.. Approval of a question

Q-1)
Descriptive Question
Reject

A low level of ionised calcium in the blood

Marks: 5
BT: Concept
CO: Mammalian cell

Complexity: Medium

Q-2)
Descriptive Question
Reject

A child defecates after meals. What is the cause of this post meal contraction

Marks: 5
BT: Concept
CO: Mammalian cell

Complexity: Medium

Q-3)
Descriptive Question
Reject

Concept-? hydroxylation in Vitamin-D metabolism takes place in

Marks: 5
BT: Concept
CO: Principles of homeostasis

Complexity: Medium

Q-4)
Descriptive Question
Reject

Memory,clinical DPG binds to _____ site of Hb and _____ release of OMemory

Marks: 5
BT: Concept
CO: Principles of homeostasis

Complexity: Medium

Preview Question Paper | Approve Question Paper

Question paper preview

Name :
Student ID :

School of MBBS

Physiology Department

Exam5 - Jun 2019

MBBS - I - 2016 -17 - MBBS806-Physiology

Total Marks (20)

Section A

Answer all Questions

Total Marks: (20)

1)	A child defecates after meals. What is the cause of this post meal contraction	Ct ell	**(5)**
2)	A low level of ionised calcium in the blood	Ct ell	**(5)**
3)	Memory,clinical DPG binds to _____ site of Hb and _____ release of OMemory	Ct sis	**(5)**
4)	"Delta cells" of stomach secrete	Ct sis	**(5)**

Question paper printing

Emergency Question Paper Print:

Course & Exam :

MBBS - I - 2016 -17 - MBBS806-Physiology - Exam5 - Sun Jun 30 2019

Edit Header

Question Paper Print

Name :

Student ID :

School of MBBS

Physiology Department

Exam5 - Jun 2019

MBBS - I - 2016 -17 - MBBS806-Physiology

Total Marks (20)

Section A

Answer all Questions

Total Marks: (20)

1)	A child defecates after meals. What is the cause of this post meal contraction	Ct ell	**(5)**
2)	A low level of ionised calcium in the blood	Ct ell	**(5)**
3)	Memory,clinical DPG binds to _____ site of Hb and _____ release of OMemory	Ct sis	**(5)**
4)	Concept-? hydroxylation in Vitamin-D metabolism takes place in	Ct sis	**(5)**

Competency based Scenarios for MCQ designs

Competency: Patient Care: Management - Clinical Interventions
Content Area: Female Reproductive & Breast

- A previously healthy 27-year-old nulligravid woman comes to the emergency department because of a 2-day history of moderate-to-severe pain and swelling of the left labia.
- She is sexually active and uses condoms inconsistently. Her temperature is 37.2°C (99°F), pulse is 92/min, respirations are 18/min, and blood pressure is 115/75 mm Hg.
- Pelvic examination shows a 4 x 3-cm, tender, fluctuant mass medial to the left labium majora compromising the introital opening.
- Which of the following is the most appropriate next step in management?

(A) Administration of intravenous metronidazole
(B) Administration of intravenous penicillin G
(C) Ultrasound-guided needle aspiration of the mass
(D) Incision and drainage
(E) Vulvectomy

Competency based Scenarios for MCQ designs are applied world over

- USMLE questions
- MRCP questions
- AMC questions

Artificial Intelligence Systems In Medical Education

- AI systems in Curriculum
- AI systems in Academic Goverence
- AI systems Dynamic Real time assessment of student
- AI systems in Self Directed Learning
- AI system In Assessment
- AI systems for CPE of CBME
- AI systems in Resource Management

Reliability of tools

Testing time in hours	MCQ (1)	Case Based Essays (2)	PMP (1)	Oral Exams (3)	Long Case (4)	OSCE (5)	Mini-CEX (6)
1	0.62	0.68	0.36	0.50	0.60	0.47	0.73

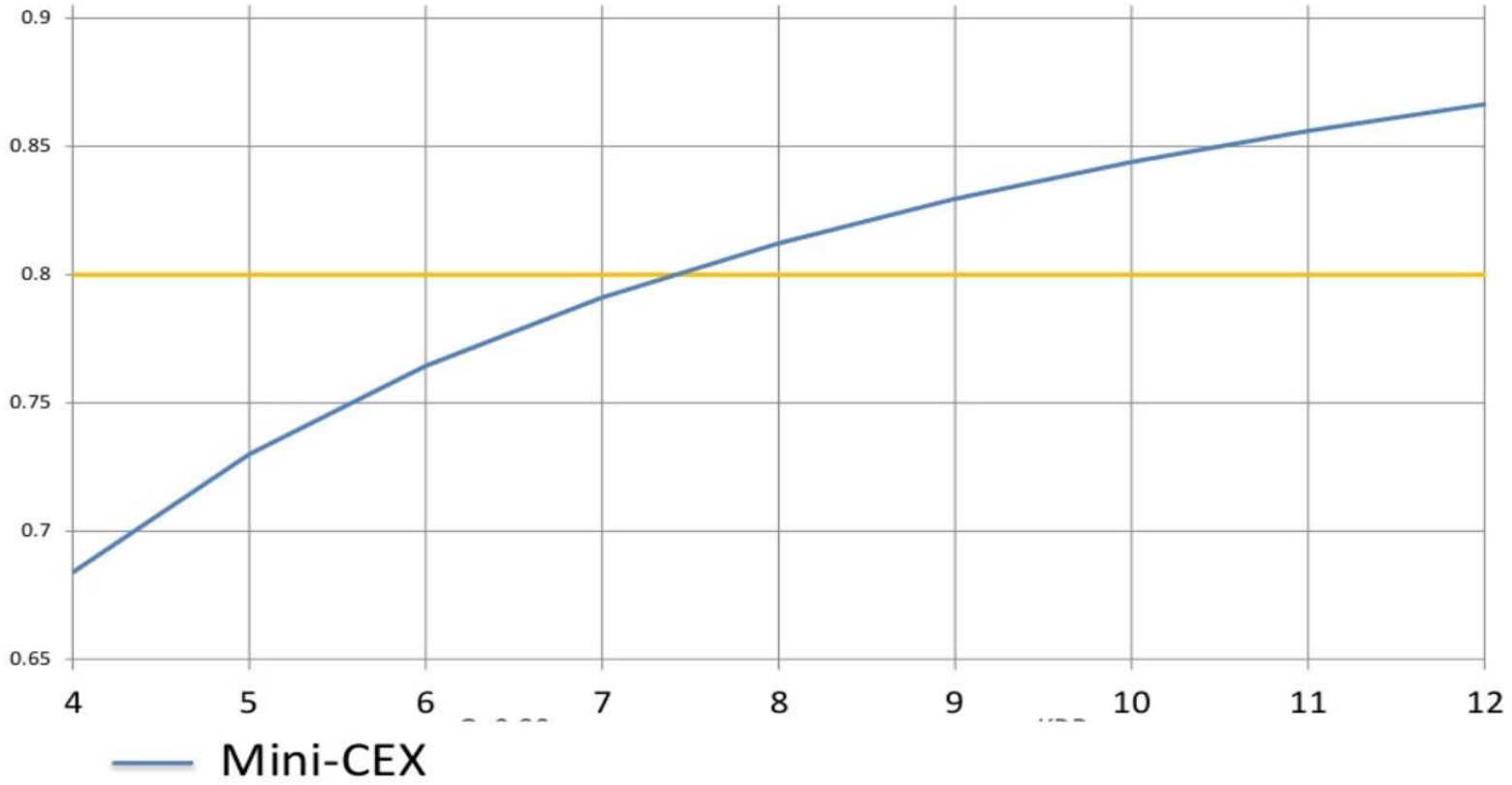
Reliability of tools

Testing time in hours	MCQ (1)	Case Based Essays (2)	PMP (1)	Oral Exams (3)	Long Case (4)	OSCE (5)	Mini-CEX (6)
1	0.62	0.68	0.36	0.50	0.60	0.47	0.73
2	0.76	0.74	0.53	0.69	0.75	0.64	0.84
4	0.93	0.84	0.69	0.82	0.86	0.78	0.92
8	0.93	0.84	0.82	0.90	0.90	0.88	0.96

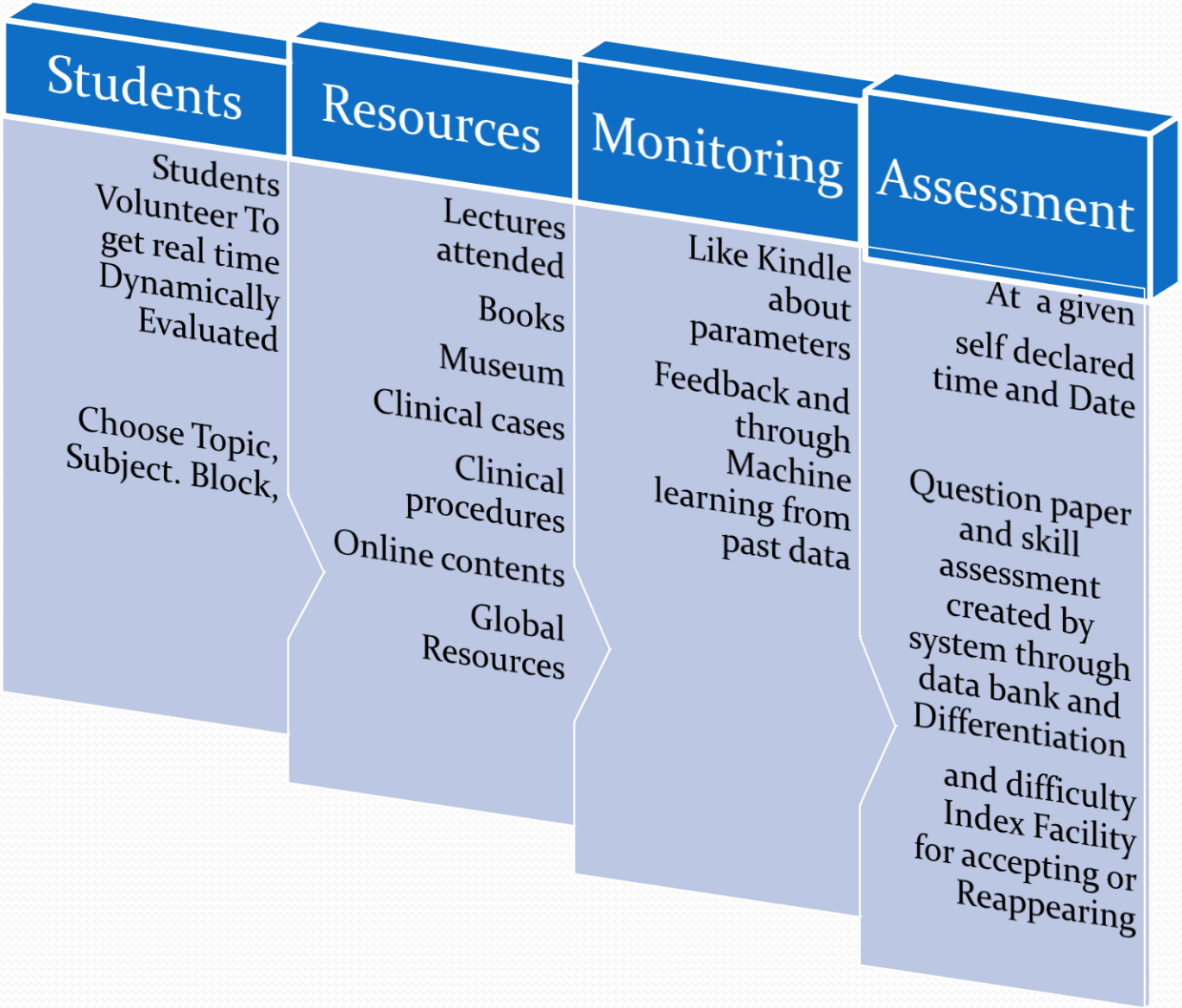
1 Norcini et al., 1985; 2 Stalenhoef-Halling et al., 1990; 3 Swanson, 1987; 4 Wass et al., 2001; 5 Petrusa, 2002; 6 Norcini et al., 1999

Reliability as a function of sample size

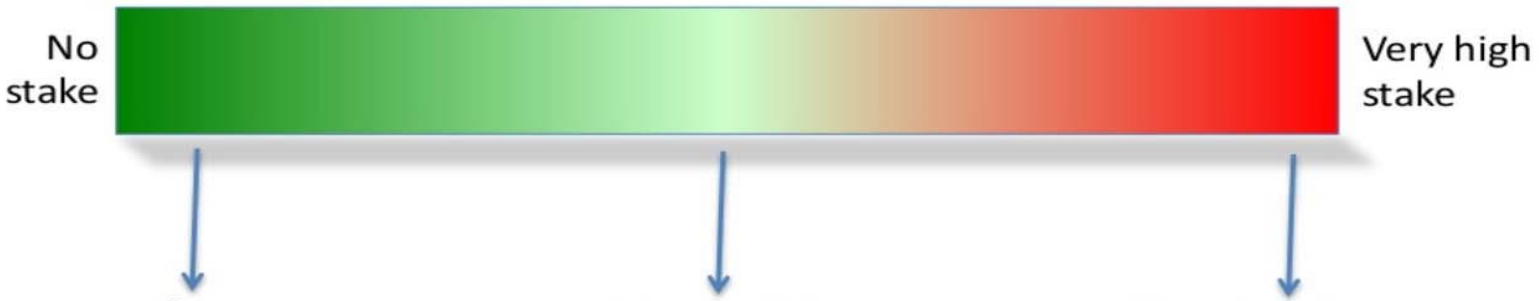
(Moonen et al., 2013)



Dynamic Real time assessment of student



Continuum of stakes, number of data point and their function



One Data point:

- Focused on information
- Feedback oriented
- Not decision oriented

Intermediate progress decisions:

- More data points needed
- Focus on diagnosis, remediation, prediction

Final decisions on promotion or selection:

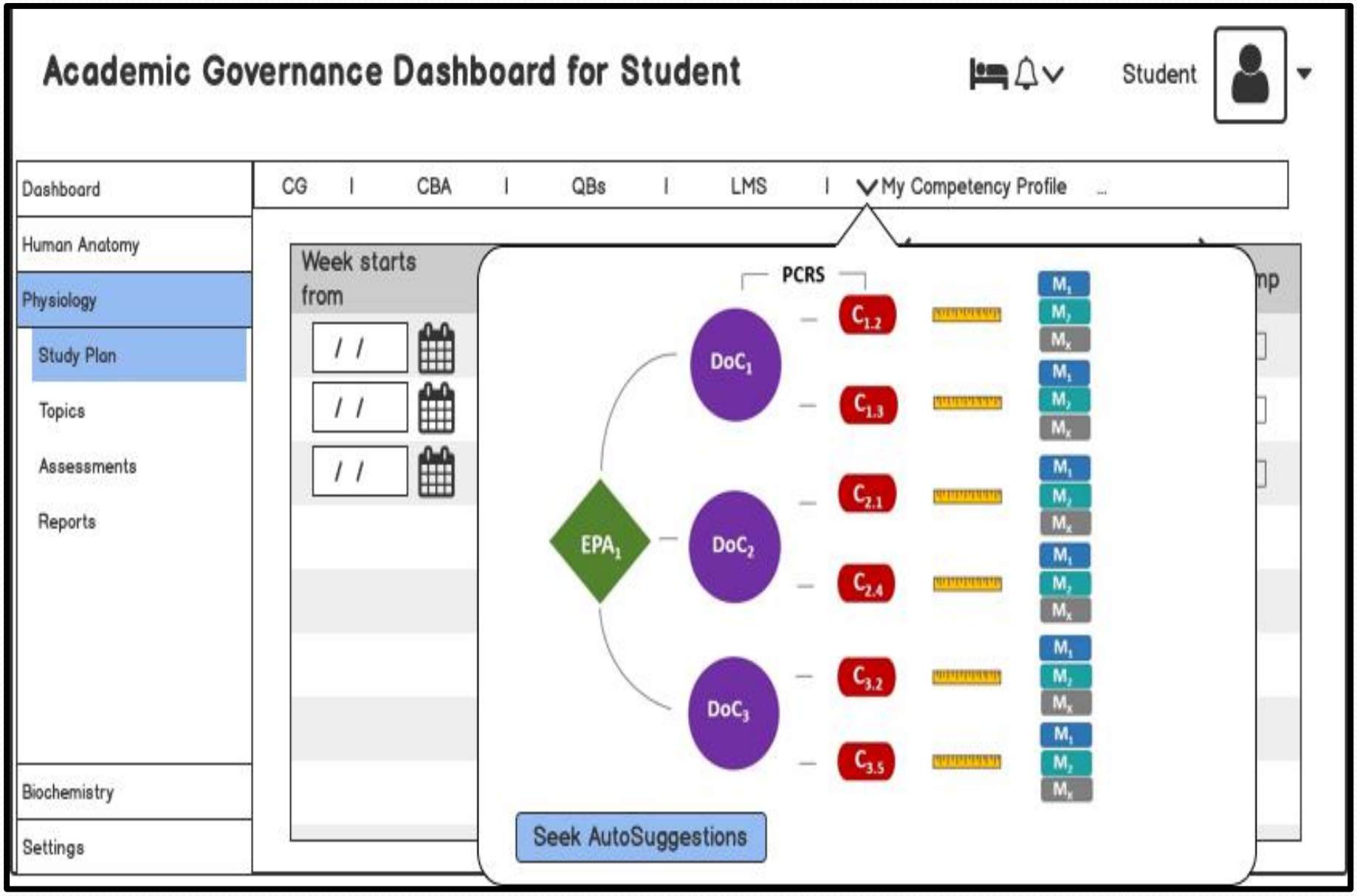
- Many data points needed
- Focused on a (non-surprising) heavy decision

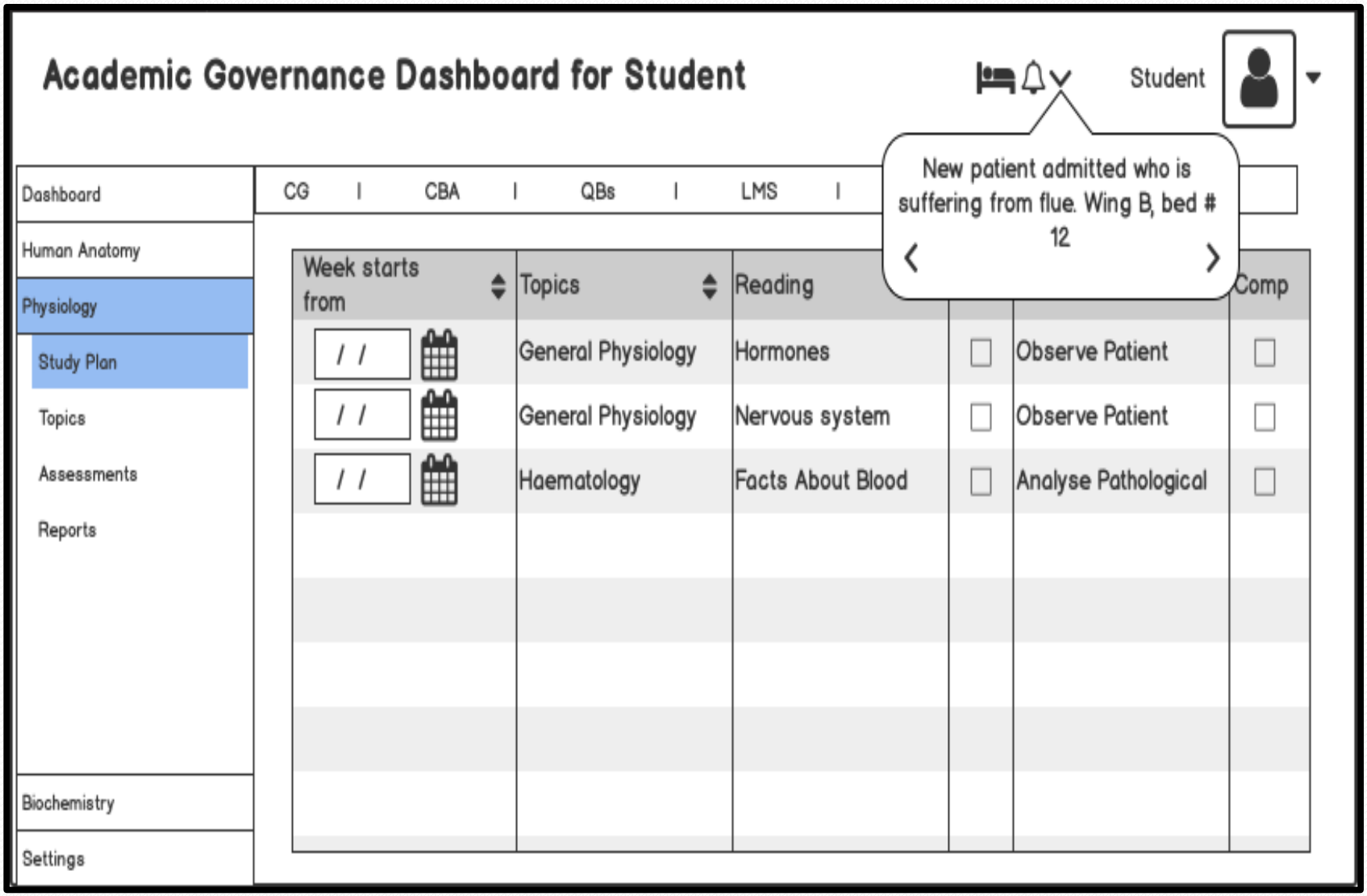
Programmatic Assessment : For

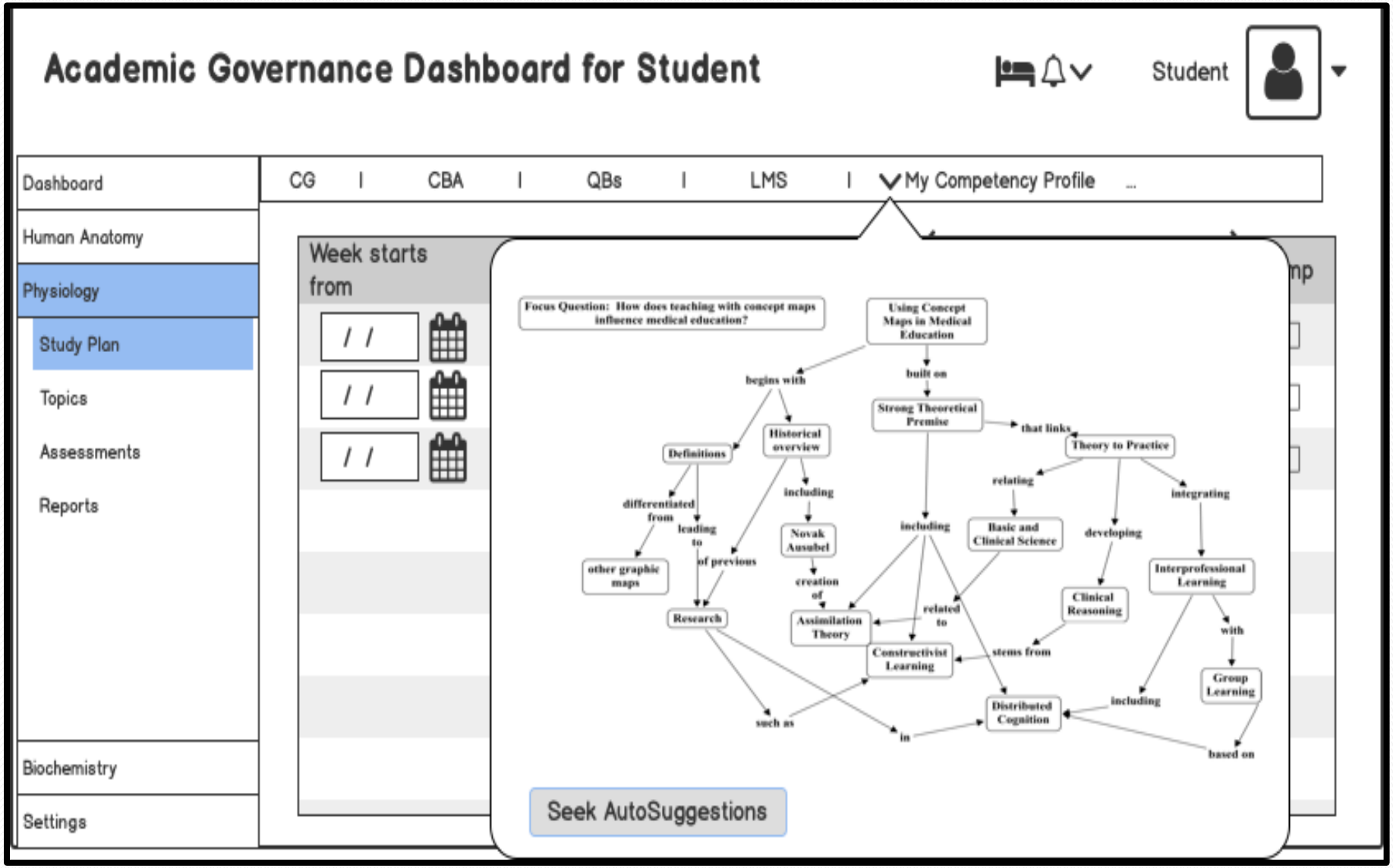
- Neutralizes the limitations of traditional assessment
- High-stakes decision is not based on the outcome of a single assessment
- Informal assessments also find a place in the final decision
- Feedback is the back bone of the entire process
- Both quantitative and qualitative feedback are given equal weight-age
- Mentor-Mentee system plays an important role in improving the student performance
- Helps Assessors to take an evidence based high-stakes decision

Programmatic Assessment : Against

- It requires extensive microplanning for the success of this form of aassessment
- The performance in each of the assessments has to be compiled for each student, which is a tedious task
- Difficult to quantify for inexperienced faculty members
- Feedback can be disheartening, if not delivered constructively
- Compilation remains a difficult task
- Often it takes a back-seat and faculty members do not find time for the same
- Provided the plan for the entire academic year is well designed right at the start of the year

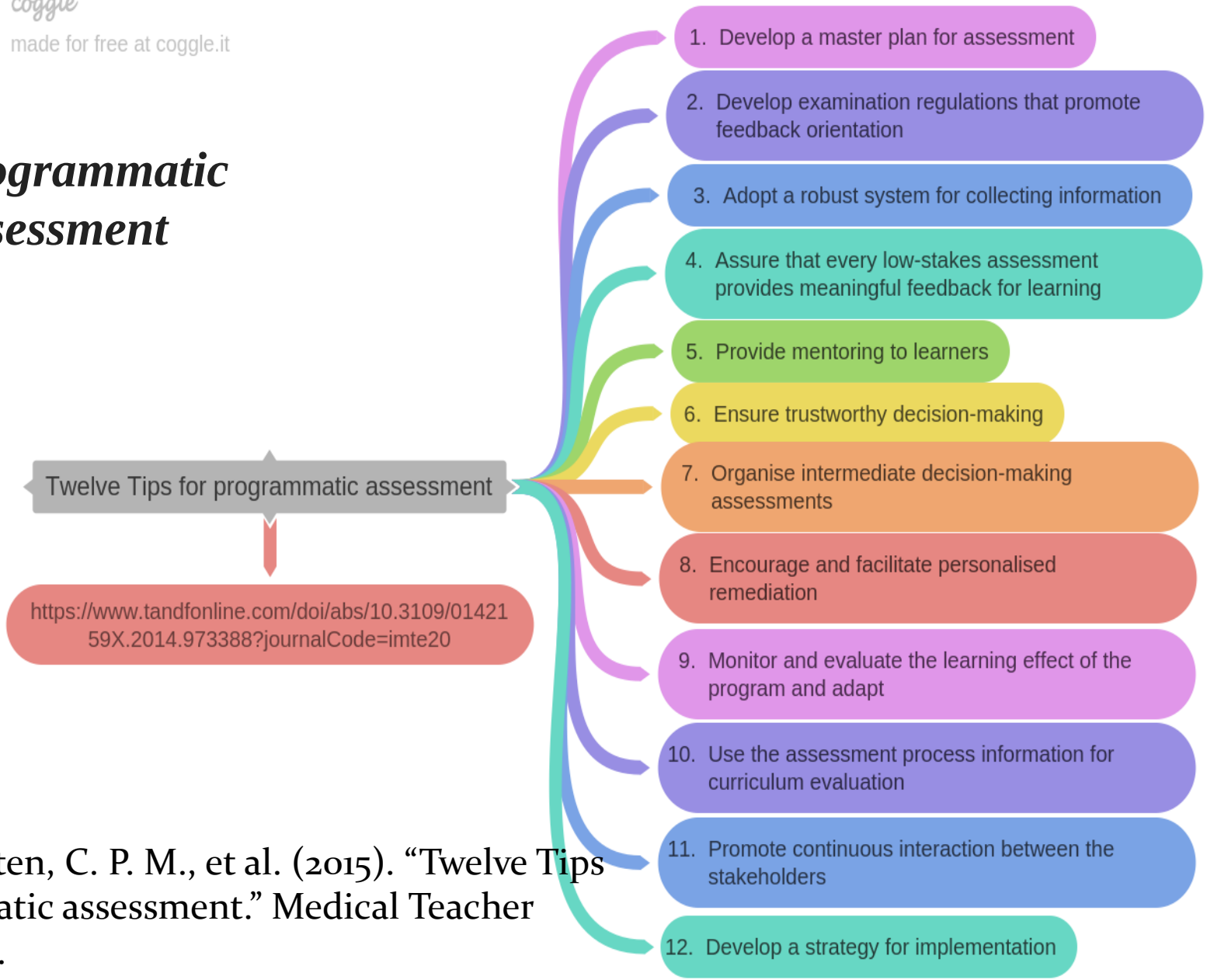

Academic Governance Dashboard for Student
Student
Dashboard
Human Anatomy
Physiology
Study Plan
Topics
Assessments
Reports
Biochemistry
Settings
CG
CBA
QBs
LMS
My Competency Profile
Week starts from
PCRS
EPA1
DoC1
DoC2
DoC3
C1.2
C1.3
C2.1
C2.4
C3.2
C3.5
Seek AutoSuggestions


Academic Governance Dashboard for Student
Student
New patient admitted who is suffering from flue. Wing B, bed # 12
Dashboard
Human Anatomy
Physiology
Study Plan
Topics
Assessments
Reports
Biochemistry
Settings
CG
CBA
QBs
LMS
Week starts from
Topics
Reading
Comp
/ /
General Physiology
Hormones
Observe Patient
/ /
General Physiology
Nervous system
Observe Patient
/ /
Haematology
Facts About Blood
Analyse Pathological

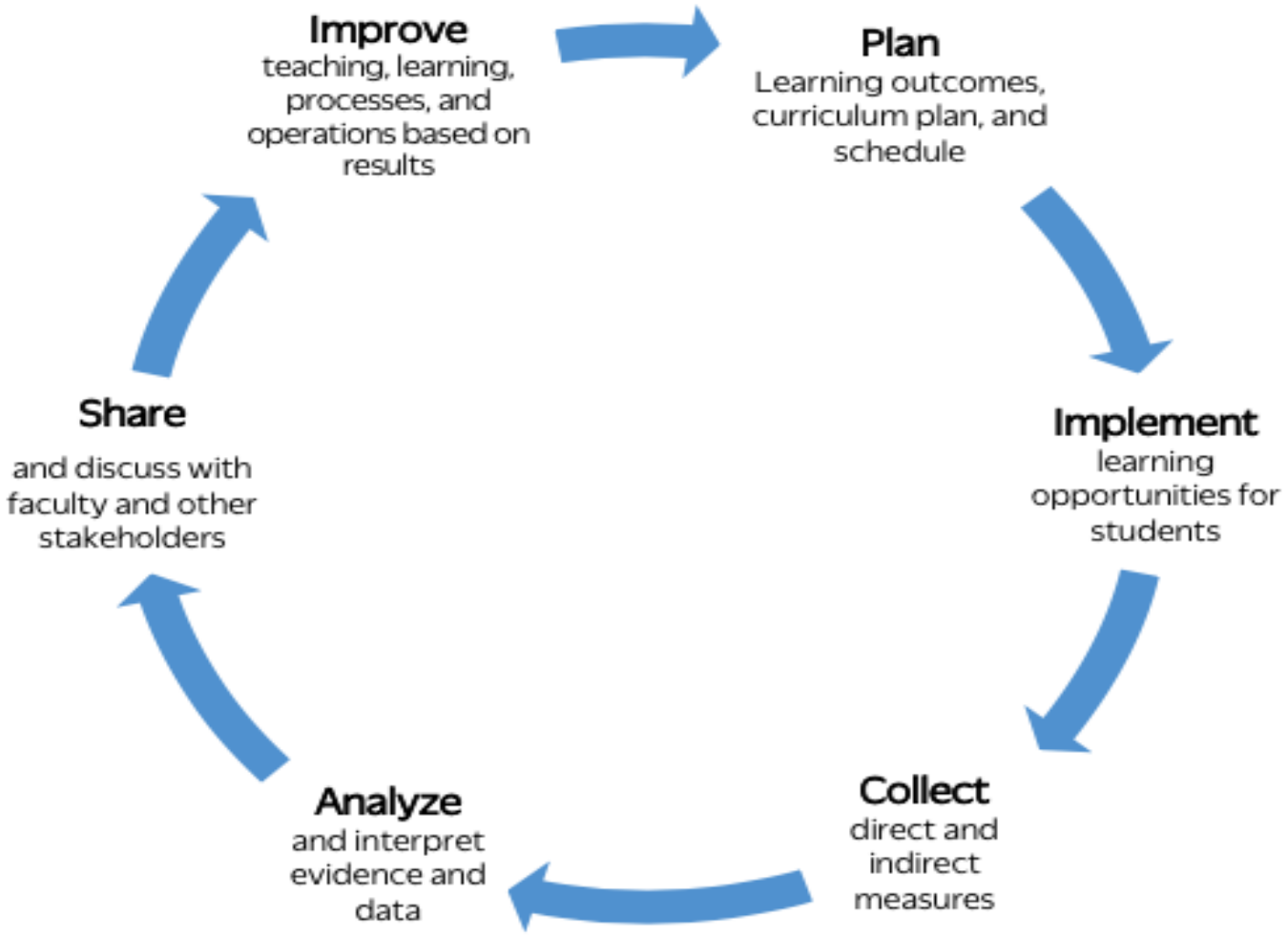

Academic Governance Dashboard for Student
Student
Dashboard
Human Anatomy
Physiology
Study Plan
Topics
Assessments
Reports
Biochemistry
Settings
CG | CBA | QBs | LMS | My Competency Profile ...
Week starts from
/ /
/ /
/ /
Focus Question: How does teaching with concept maps influence medical education?
Using Concept Maps in Medical Education
begins with
built on
Strong Theoretical Premise
that links
Theory to Practice
Definitions
Historical overview
relating
integrating
differentiated from
leading to
including
Novak Ausubel
including
Basic and Clinical Science
developing
other graphic maps
of previous
creation of
Interprofessional Learning
Clinical Reasoning
Research
Assimilation Theory
related to
with
Constructivist Learning
stems from
Group Learning
such as
including
Distributed Cognition
in
based on
Seek AutoSuggestions

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Programmatic Assessment



Van Der Vleuten, C. P. M., et al. (2015). "Twelve Tips for programmatic assessment." Medical Teacher 37(7): 641-646.


Improve
teaching, learning, processes, and operations based on results
Plan
Learning outcomes, curriculum plan, and schedule
Implement
learning opportunities for students
Collect
direct and indirect measures
Analyze
and interpret evidence and data
Share
and discuss with faculty and other stakeholders

Artificial Intelligence Systems In Medical Education

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- AI systems in Resource Management

Resource management for Student

- Books
- Recorded VDOs
- Global Resources
- Online PowerPoints
- Live chat
- Related patient in Ward
- Related Operation in OT blocks

- Global Resources
- Endoscopic Thyroidectomy https://websurg.com/fr/doi/lt03enanuwong001/

- Online Power Points
- Iodine deficiency goiter
- https://static1.squarespace.com/static/573786f87c65e49dc21b27c1/t/5c497298758d46280bf2e85d/1548317343081/iodine+deficiecy+goiter+upload.pdf

Resource management for Student

- Books
- Recorded VDOs
- Global Resources
- Online PowerPoints
- Live chat
- Related patient in Ward
- Related Operation in OT blocks

- Related patient in Ward
- Connect with EMR system of Medical college Hospitals



- SMS to student as per his area of study

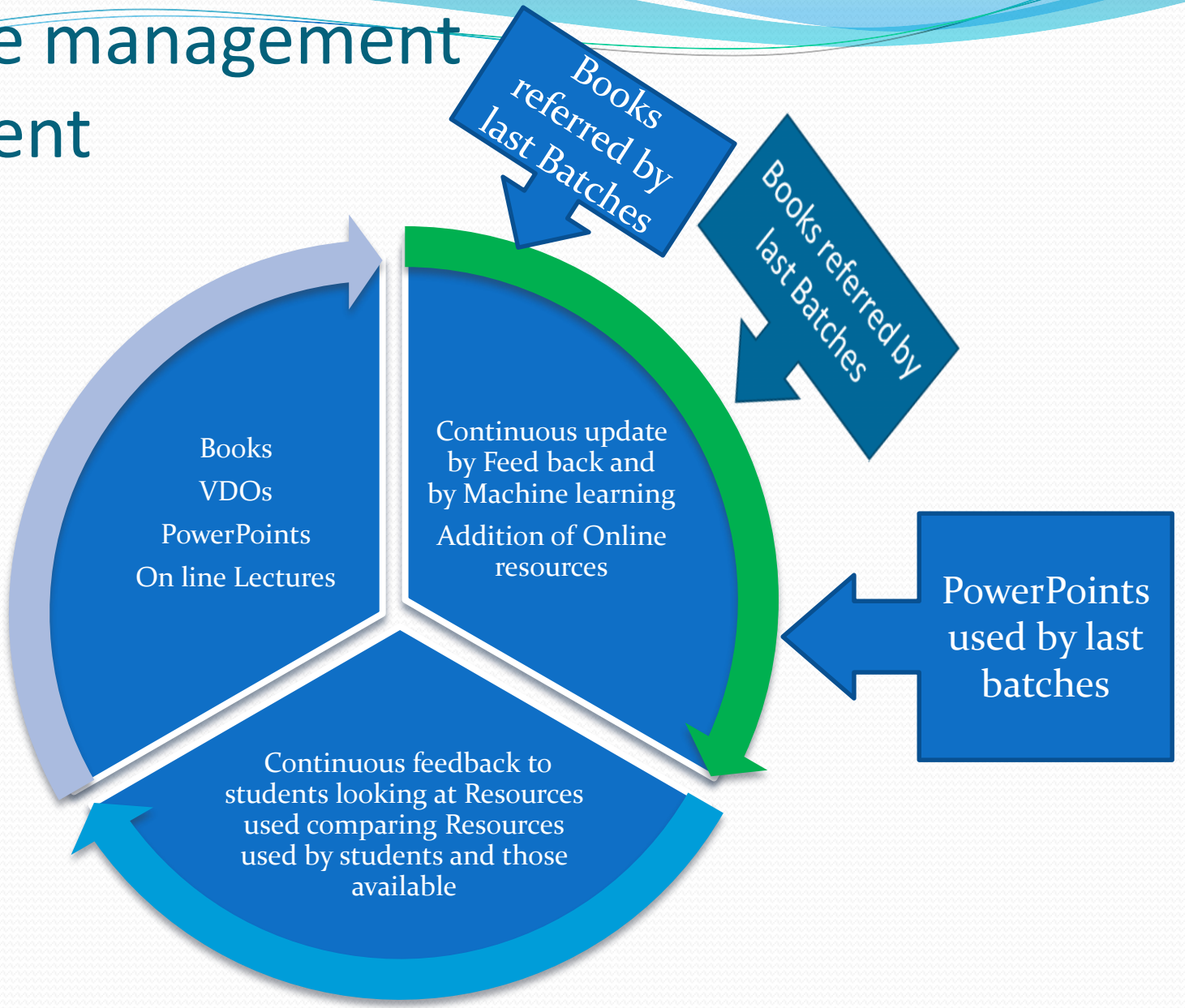
- Related Operation in OT blocks
- Connects OT list of all Theater

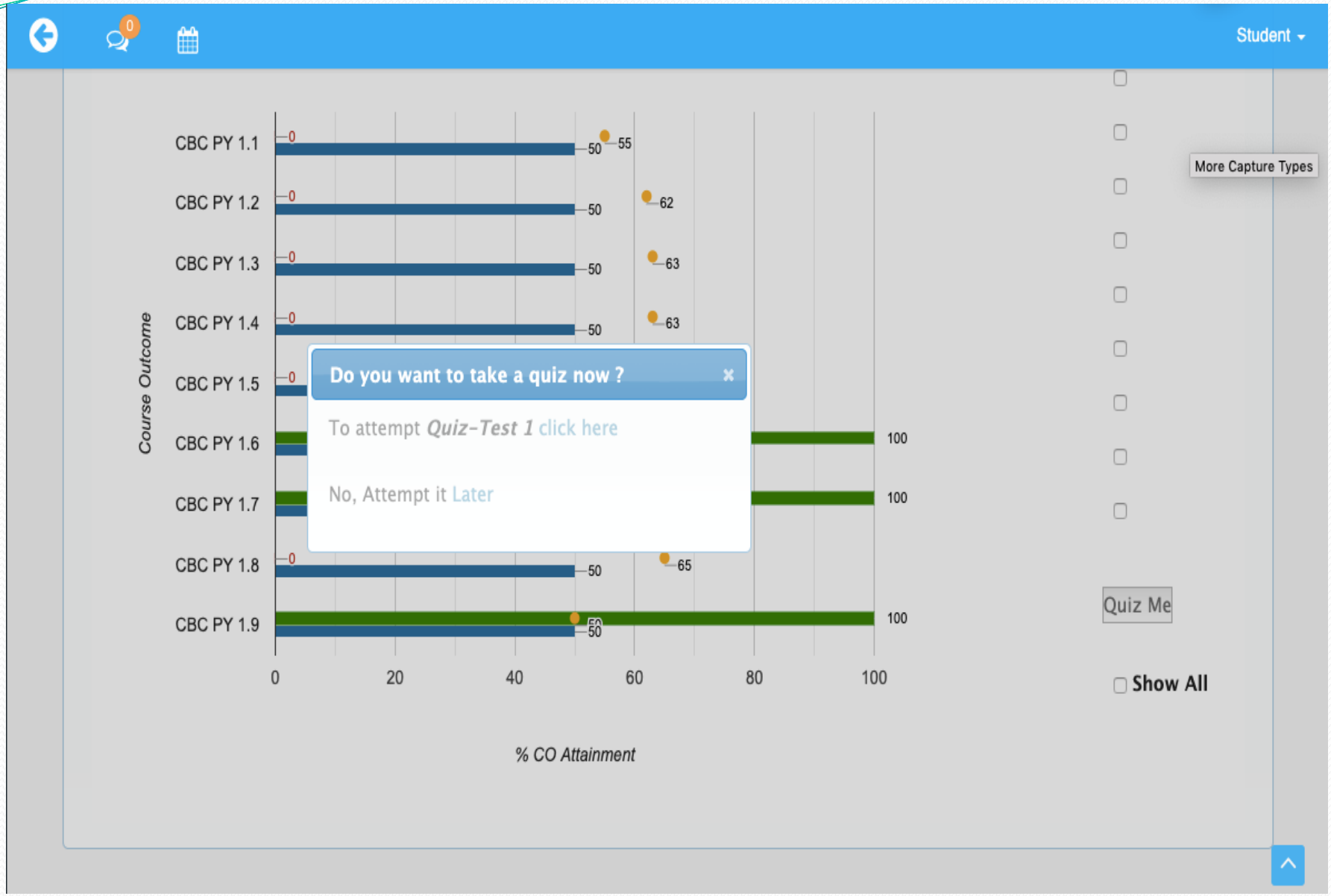


- SMS to student as per his area of study

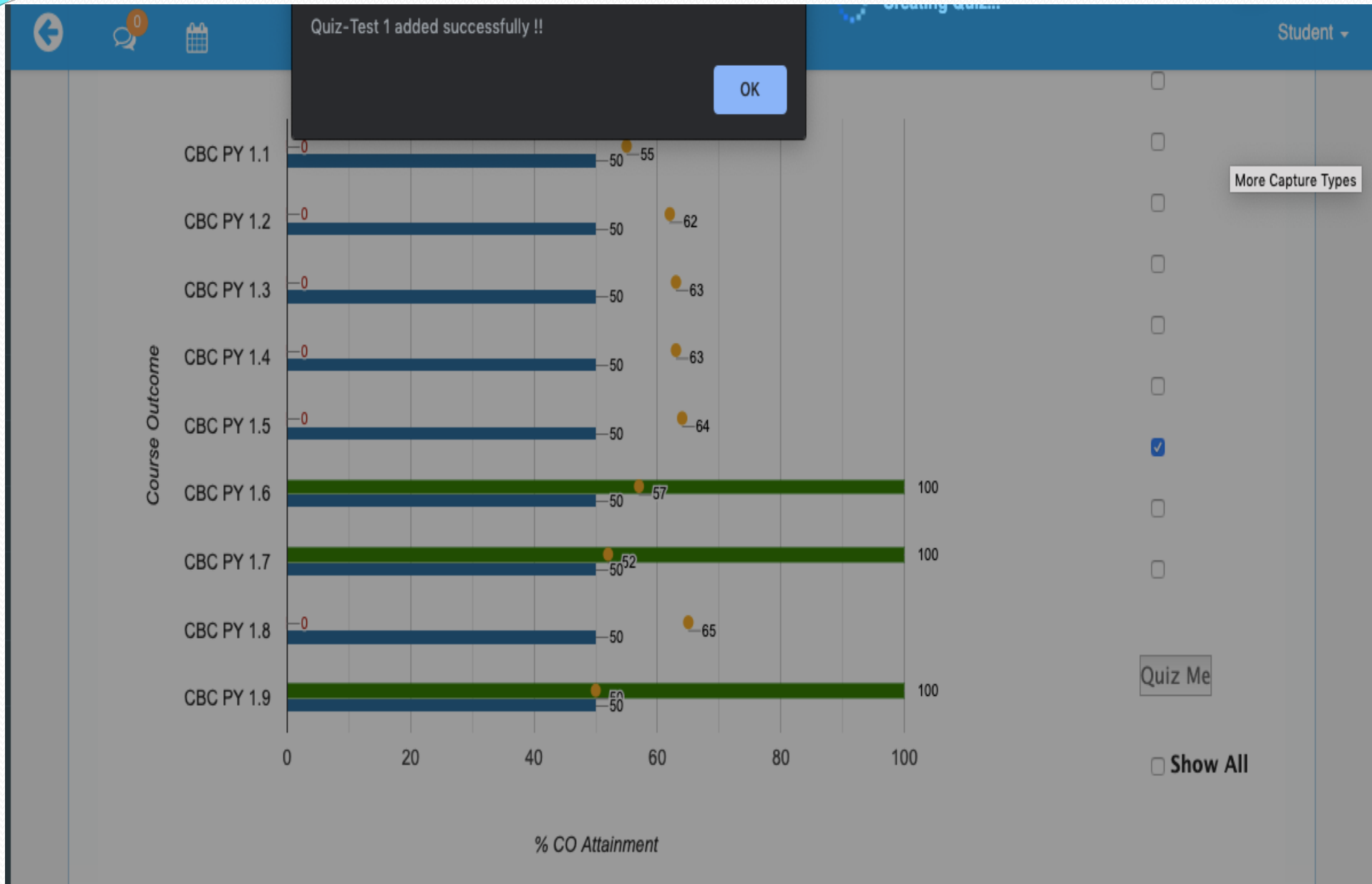
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Resource management for Student

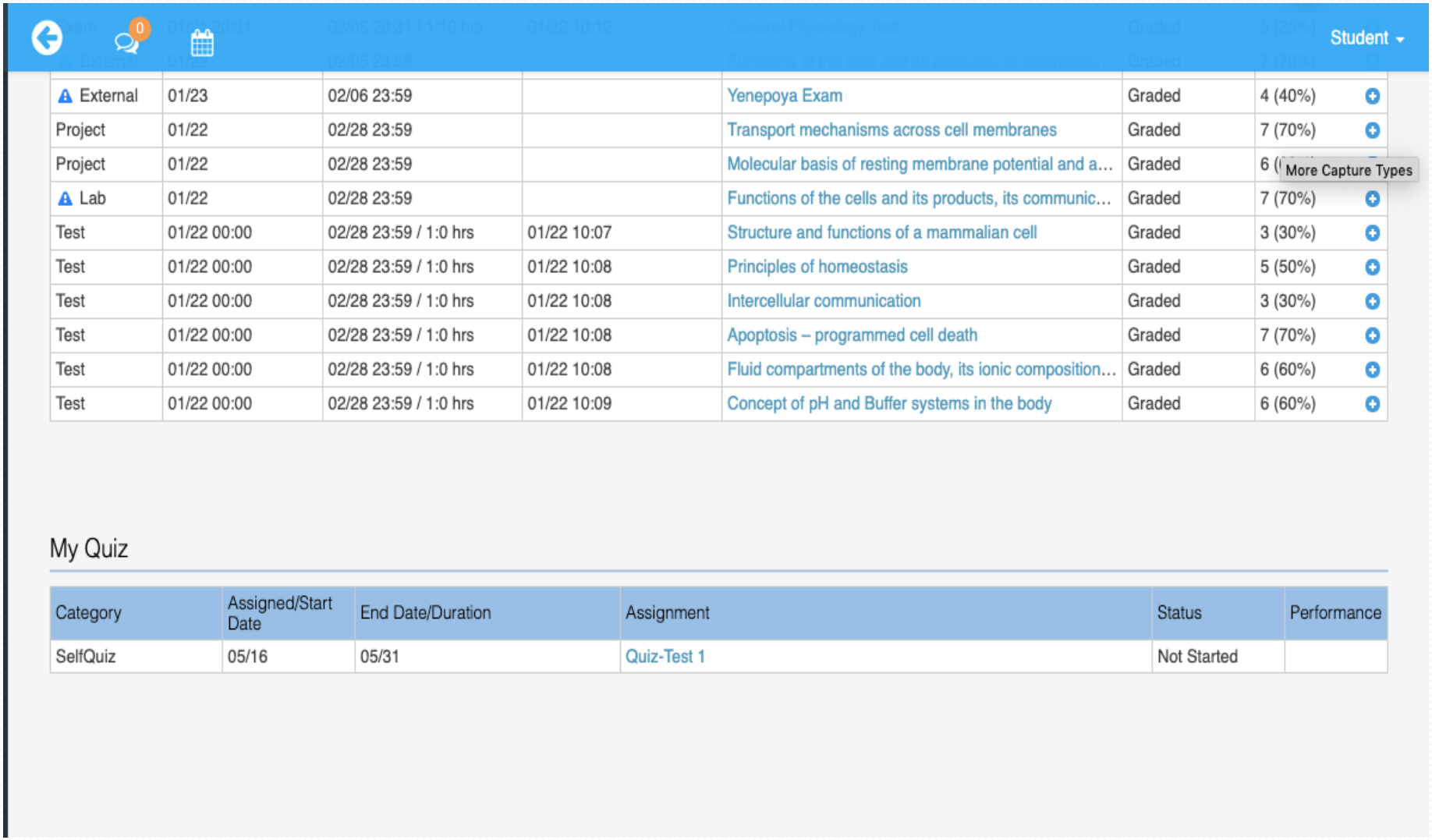



Student
CBC PY 1.1
CBC PY 1.2
CBC PY 1.3
CBC PY 1.4
CBC PY 1.5
CBC PY 1.6
CBC PY 1.7
CBC PY 1.8
CBC PY 1.9
Course Outcome
0
50
55
62
63
63
100
100
65
100
0
20
40
60
80
100
% CO Attainment
Do you want to take a quiz now ?
To attempt Quiz-Test 1 click here
No, Attempt it Later
More Capture Types
Quiz Me
Show All

Self-Learning: Self Quiz Initiated



Self-Learning: Quiz Accessed



Student

Quiz-Test 1 I Not submitted

[Start Time : 0.00] - [Test Duration : 00:00:00] - [Time Left : 0:00]

More Capture Types

Question Set 1 Of 1 Previous Next Submit

1 2

1. A newly posted junior doctor had difficulty in finding out base deficit/excess for blood in a given patient. An experienced senior resident advised a quick method to determine acid base composition of blood based on PC02- Which of the following is the likely method he suggested to predict acid base composition of blood? (1)

   A. Red ford normogram
   B. DuBio's normogram
   C. Goldman constant field equation
   D. Siggard-Andersen normogram

2. A newly posted junior doctor had difficulty in finding out base deficit/excess for blood in a given patient. An experienced senior resident advised a quick method to determine acid base composition of blood based on PC02- Which of the following is the likely method he suggested to predict acid base composition of blood? (1)

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The half of **knowledge, is knowing where to find knowledge**. is inscribed over the doors of Dodd Hall at FSU.



https://medicaledu.moodlecloud.com

self directed learning

medicaledu

ENGLISH (EN)

Hitesh Vyas

Home

Dashboard

Calendar

Private files

Site administration

Medical Education with Moodle

Course categories

Expand all

Ophthalmology (6)

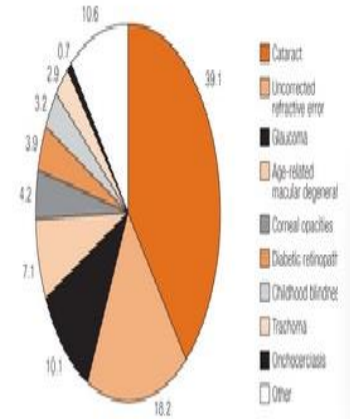
Moodle (1)

Available courses

Stye, Chalazion, Pterygium

BLINDNESS DATA

Fig. 1. Global causes of blindness as a percentage of total blindness, 2004



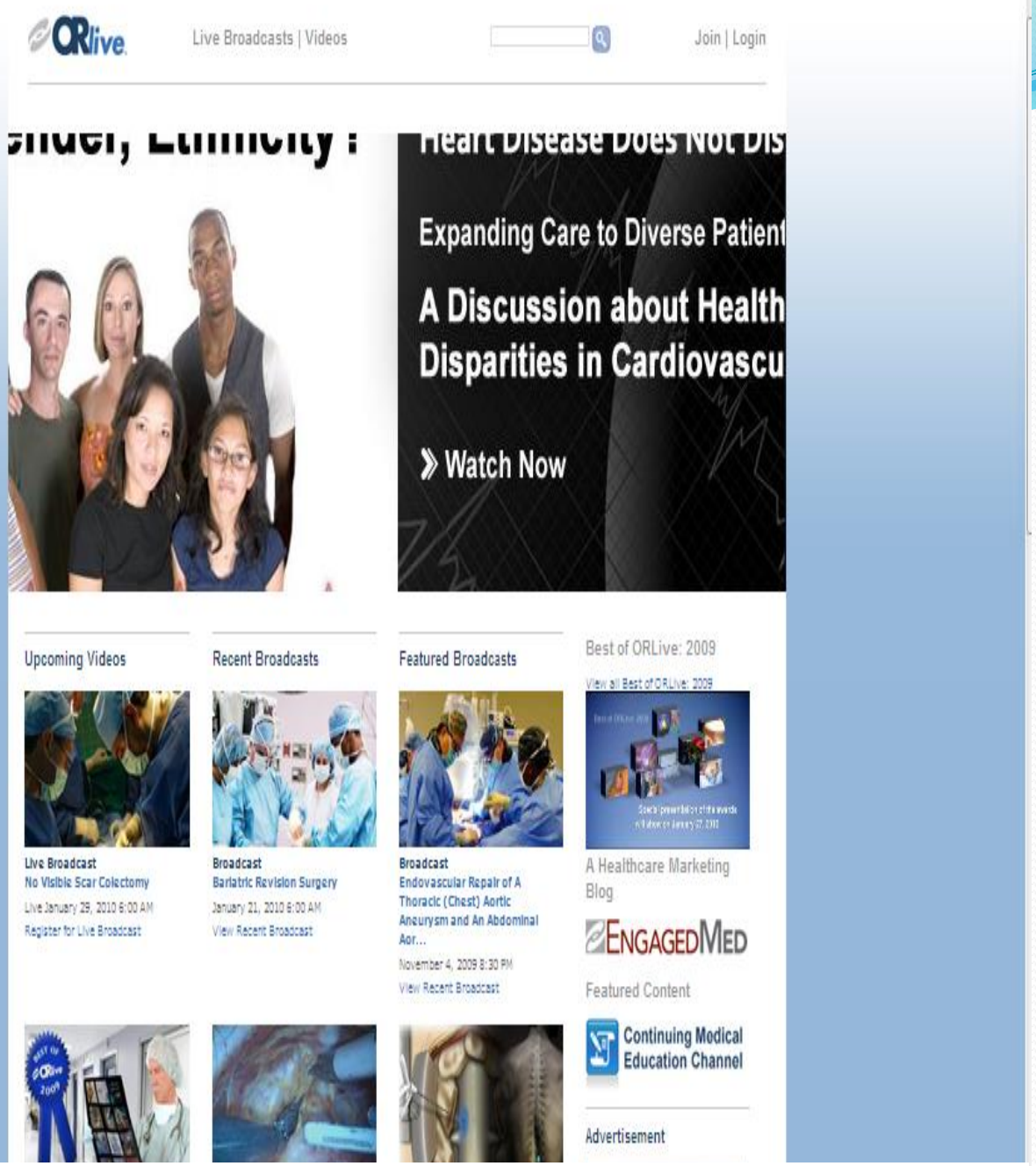
Portal



www.websurg.com/m



Weblink: www.websurg.com



http://www.orlive.com/

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Competencies Expected of MBBS Graduates when they join a Surgical Residency

Understand the structural and functional basis, principles of diagnosis and management of common surgical problems in adults and children.

IMPORTANCE					YOUR ABILITY			
Low	Moderate	High	Very High		Low	Moderate	High	Very High
☐	☐	☐	☐	Develop a differential diagnosis, evaluation and treatment plan for common **surgical GI symptoms** e.g*. ncluding diarrhea, constipation, bleeding, jaundice, appendicitis, dysmotility, colitis, ulceration, acute and chronic pancreatitis	☐	☐	☐	☐
☐	☐	☐	☐	Physical findings and differential diagnosis in a patient with **abdominal pain**	☐	☐	☐	☐
☐	☐	☐	☐	Recognize clinical & radiologic features of **bowel obstruction** and its major causes	☐	☐	☐	☐
☐	☐	☐	☐	physical findings and differential diagnosis of **Common Urological Problems**	☐	☐	☐	☐

Original Research Article

Expected Surgical Competencies of an Indian Medical Graduate: A Gap Analysis Using a Cross-sectional Survey

Arun Jamkar[1], Payal Bansal[2], Seema Patrikar[3], Gaurang Baxi[4]

[1]Vice Chancellor, Maharashtra University of Health Sciences, [2]Professor and Head, Institute of Medical Education Technology and Teachers' Training, Maharashtra University of Health Sciences, [4]Assistant Professor, Institute of Medical Education Technology and Teachers' Training, Maharashtra University of Health Sciences, Nashik, [3]Statistician, Department of Community Medicine, Armed Forces Medical College, Pune, Maharashtra, India

ABSTRACT

Background: In 2010, the Medical Council of India published the Vision 2015 document, which sought to create an 'Indian Medical Graduate' as a 'physician of first contact of the community while being globally relevant'. This vision for undergraduate medical education is proposed to be realised through a competency-based curriculum. We conducted a gap analysis using a cross-sectional survey to document surgeons' perceptions regarding competencies identified in surgery. **Methods:** Eight competencies specific to surgery are proposed, which formed the basis for the study. We defined sub-competencies for each of these and developed a questionnaire containing ratings of importance and ability for the sub-competencies from low to very high on a 4-point Likert scale. The questionnaire was administered to 450 surgeons attending a state-level annual conference in surgery asking them to provide the importance ratings and their own ability on those (sub) competencies when they graduated. The importance and ability ratings were ranked and a gap analysis was done. **Results:** The study response rate was 69.8%. While most competencies were perceived by the surgeons as being highly important, their self-ratings revealed a statistically significant gap between importance and ability when they graduated. They also rated themselves as being more competent on some than on others. Some competencies were high on importance as well as on ability, while others were high on importance but low on ability, revealing a gap. A low importance–high ability relationship was seen for a few competencies. Competencies related to emergency and trauma care and communication had the largest gaps. **Discussion:** The gaps identified in surgical competencies for graduating physicians are specific and have implications for the competency-based curriculum and implementation in terms of teaching, assessment and faculty development. It also has implications for seamless transition between undergraduate and postgraduate competencies, as all of these are prerequisites at the start of a surgical residency.

Keywords: Surgical competencies, Indian Medical Graduate, competencies, gap analysis

Competency based professional development education

Case Study of ScrumAlliance
https://www.scrumalliance.org/

ScrumAlliance® Certification For Organizations Events Resources About Scrum LOG IN



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All Course Types

All Countries/Regions

03/22/2020

Search →

Scrum Education Units

What qualifies as SEUs?

Any activity that helps you develop as a Scrum or agile practitioner will be accepted. Many educational activities easily count for SEU credit. Reading books, attending mentoring or training sessions, watching webinars, and volunteering are just a few ideas. Please review the SEU page for more examples.

How do I know which category to log it under?

If you are unsure or if it qualifies in multiple categories, please log it under the one you feel fits best.

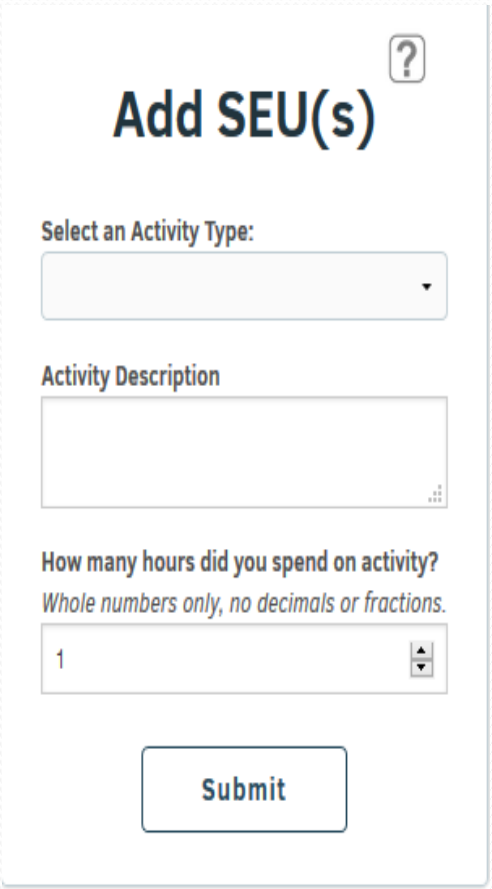
How recent do they have to be?

For all certification renewal cycles, SEUs must have been earned within 30 months of your next renewal date.

Is there a guide to entering hours?

All hours are entered as whole numbers. Please round up as required. For example, if you watched a webinar for 30 minutes, round up to 1 hour.

Add and manage SEUs



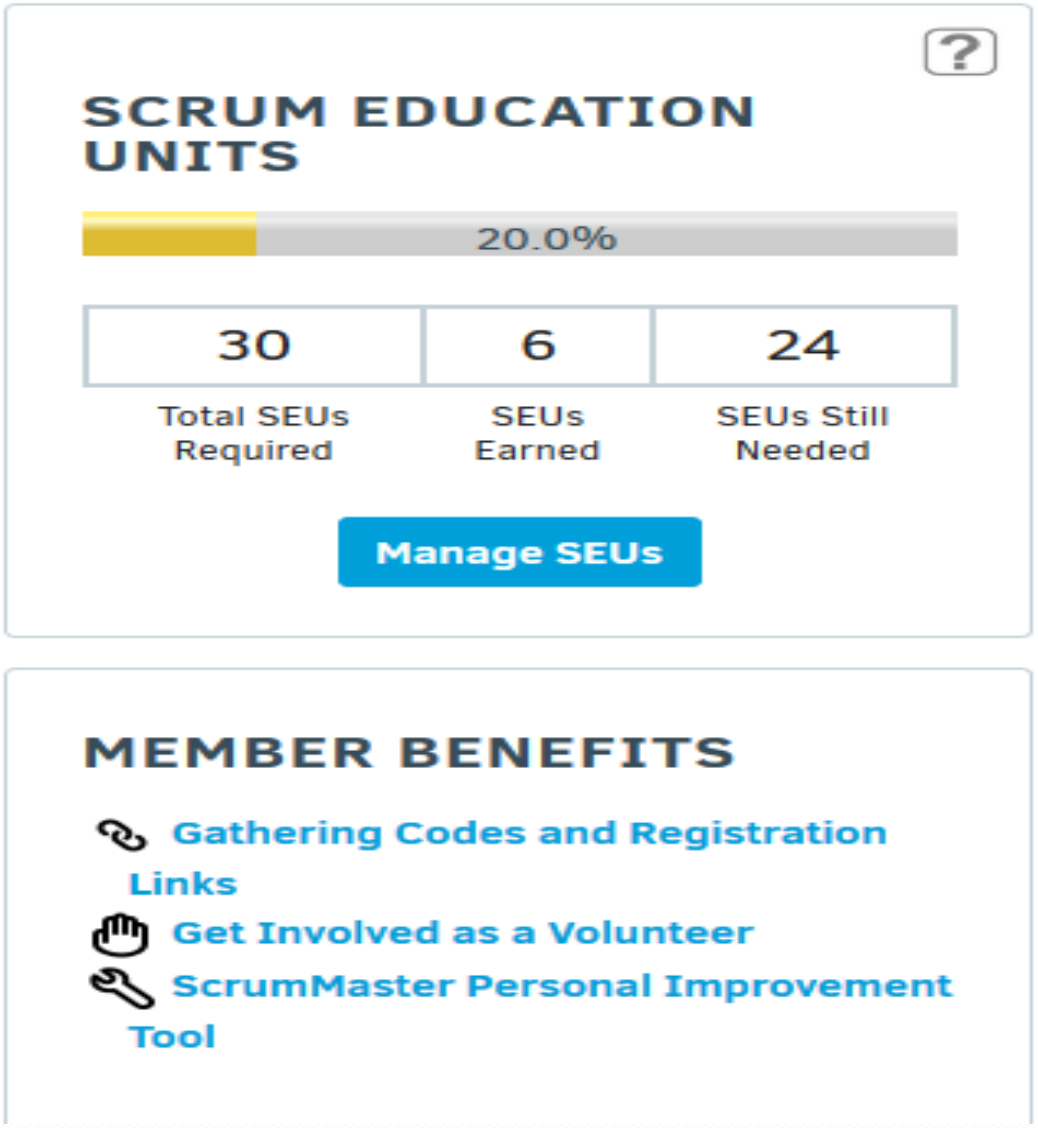
Available SEUs

TOTAL AVAILABLE SEUS: 6

(These are SEUs that are available for renewal.)

Activity Type	Activity Description	SEU Hours	Actions
Event	Back to Basics Event by Leanpitch Agenda: Agility, ...	3	
Event	Product Tank June: Product Metrics that matter A	3	

Gamified Dashboard showing Progress




Thank you
arunjamkar.com
Prof Dr Arun Jamkar