Computer in health medical education

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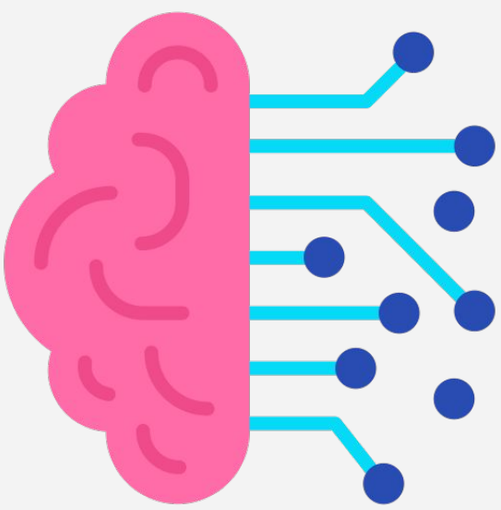
Outlines

1. Reality of Healthcare.
2. Healthcare Education.
3. Theories of Learning.
4. Mode of Computer-based learning.

أخيرا وصلنا لأخر محاضرة, كل الشكر لأعضاء الفريق على تطوعهم ثم جهودهم و إبداعهم
"إن أصبنا فمن الله و إن أخطئنا فمن أنفسنا ومن الشيطان"

- أسيل بادخن
- العنود المنصور
- العنود العتيبي
- أروى الجهني
- دانه الرشيد
- مها بركه
- مشاعل القحطاني
- رهف الشمري
- ريما الديحان
- أنس السيف
- فهد النهابي
- صالح محجوب
- تميم الوهيبي
- يزيد الشثري
- خالد الدوسري
- عبدالله الزهراني



-Multidisciplinary team means we have different professionals who all need to share their information! This creates an information rich environment that needs proper interaction to share all these information. Here the role of computer comes -we can use EHR- to help us share the information and deliver the quality of care we are aiming to.

Reality of healthcare

Why we need computer in healthcare

Multidisciplinary team

Constant learning

e.g. CME

Provide high quality care

Information Rich Environment

A lot of resources

Healthcare Education

In KSU

Types	Examples
1. Problem-based learning , Case-based learning	—
2. Content In 1st and 2nd year during medical school we learn the physiological processes while during 3rd year up to 5th year, we learn procedures, effects of interventions. Throughout the five years of medical school we learn the soft skills.	Components of the content: • Physiological processes. • Procedures, Effects of Intervention. • Soft skills (interpersonal skills (interviewing patients), leadership, ethics). • Information & Communication Technology (ICT) skills (basic Office, library database, smartphone Apps).
3. Teaching Strategies	• One-way lecture based. Passive learning • Two-way interactive (Computer-based, e-learning). • Online.
4. Assessment Methods	• Multiple choice Questions (Midterm, Final). • Short answers. • Assignment. • Project. • Presentation.

-**Behaviorism:**
Like rewarding a child when does a good thing so this becomes a stimulus for their behavior. Also, when the lecturer gives a picture to answer a question so they stimulate us to answer.

-We need to understand these theories in order to understand how to use the computer to support these theories

Theories of Learning

Behaviorism

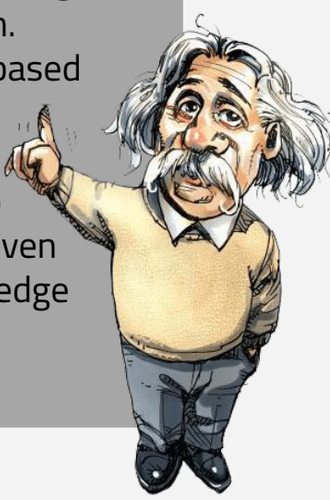
- How one learn by looking at the observable behaviour.
- Based on stimuli and responses.
- Not all process of learning can be measured (such as understanding, reasoning).

Cognitive Science

- The process of learning is based on thinking.
- Mind is information processing system.
- Learning is permanent change in cognition.
- Brain is no longer black box, **it is a dynamic system.**

Constructivism (used in KSU)

- Learning process through interaction.
- Problem-based learning . (PBL)
- Arriving to solution given the knowledge available.



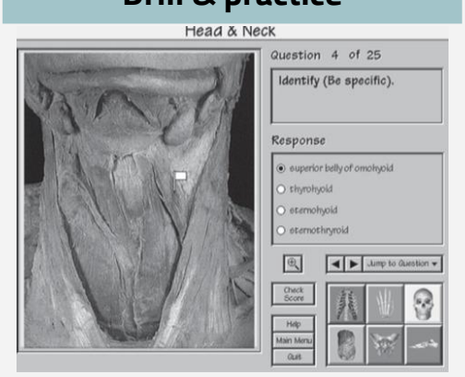
Mode of Computer-based learning

- Student needs references to facts.
- Must know how to apply to form.
- Computer is used for a wide range students to allowing student to and knowledge diagnostic hypothesis & plan therapies of learning methods from drilling explore a body of material. It allows for updated practice (using up-to-date resources)
- **Examples:**
  a. Drill and Practice.
  b. Digital Lecture.
  c. Exploration.
  d. Problem- based learning
  e. Simulation

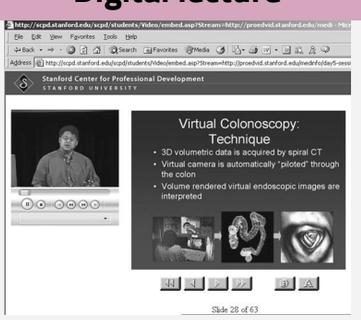
Mode of Computer-based learning

Mode	Definition	Advantages & Disadvantages
Drill and Practice	1. Present material to students 2. Answer MCQ 3. Repeat till mastery 4. Move to the next material The student will answer the MCQ and during that he/she will be assessed and would not be able to proceed to next question until they got the right answer.	• **Advantages:** 1. Student can learn factual material. 2. Allow everyone to learn on their own pace without needing one to one guidance. Anytime, anywhere!
Digital Lecture	1. Recorded and broadcast to students. 2. Podcast, Webinars. 3. Other media: Youtube, Slideshare. 4. Open Courseware by MIT (2001) can be shared across partner universities.	• **Advantages:** You can go back to the lecture at any time and listen to it repeatedly. • **Disadvantages:** The lecturer won't be available when needed
Exploration	• Students have the freedom to explore without guidance and interruptions. Totally the opposite of drill and practice • E.g Brain structure- explore the images, observing the location, size of structure change. • **Examples:** ○ Tooth Atlas ○ Exploring dental anatomy ○ 3D model and radiographs It has an MCQ that assess the knowledge	• **Advantages:** 1. Encouraged self discovery and experimentation. • **Disadvantage:** 1. Without guidance, students may be lost (do not meet learning objectives) and wasting time exploring different aspects without the guidance leading to insufficient learning

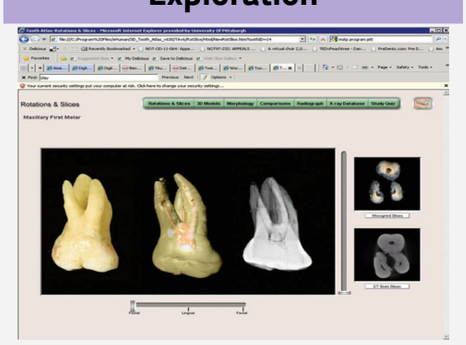
Drill & practice



Digital lecture



Exploration



Mode	Definition
Problem-based learning	• It is under the constructivism theory • Process of arriving at a solution through accessing and using a body of knowledge. • The computer presents the learner with a story that includes a problem that could be a text or any other form of data. • The learner may be required to investigate the situation. By examination, finding the problem and looking at lab and test results to find the solutions by which the computer will the an action

Simulation	• A lot of skills can be learned in such environment
	• Engage and actively involved in decision making
	  ○ Interaction between a student and a simulated patient
	• Approximate the real-world experience of patient care
	• Put attention to subject being presented
	• Simulation can be static vs dynamic
	  ○ **Static**- predefined problems and clinical outcomes. Nothing can be changed; students action doesn't influence the pathway
	  ○ **Dynamic**- simulate **changes** as students are interacting; make students understand their actions and clinical outcomes
	• Effective learning using **constructive approach to learning**
	• E.g. Immersive simulated environments

Simulation



The immersive environment of stimulation learning will be in real life settings; OR, trauma centers, ICU and the physician office. The patient will be an **artificial mannequin** that has the same dynamic of real patient; vital signs ..etc.
The learners can **play any role**; the nurse, the surgeon … etc
We need this type of learning for:
1-regular training
2-cognitive training (??)

check this point in book summary

Types of Computer-Based Learning Cont.

Scenario-, Case- and Problem- Based Learning

- The computer presents the learner with a story that includes a problem.
- The presentation may be only in text, with text and graphics, or as an interactive movie in a near realistic three- dimensional environment that replicates a space such as a clinic.
- The learner may be required to investigate the situation (examine the patient), define the problem, find any supporting resources and guide the scenario to an end goal.

Intelligent tutoring systems, mentoring, feedback and guidance

- Closely related to the structure of an interaction is the degree to which a teaching program provides feedback and guidance to students.
- Coaching systems: only when the student requests help or makes serious mistakes.
- Tutoring systems: guide a session aggressively by asking questions that test a student's understanding of the material and that expose errors and gaps in the student's knowledge.
- Mixed - initiative systems allow students freedom but provide a framework that constrains the interaction and thus helps students to learn more efficiently.

Learning through design

- Student is asked to become the teacher
- Students create Websites, games, virtual patient simulations, and other constructs, as learning tools for other students.

Disadvantage: too time-consuming for the benefit received. Lack of teacher understanding of this tool is another reason that the method is rarely used.

Uses of Technology to Support Learning

1. **Medical, Nursing, Dental and Other Health Science Students**
2. **The Practicing Professional, Continuing Education and Certification:**

▪ It has become obligatory for physicians to be lifelong learners both for their own satisfaction and, increasingly, as a formal government requirement to maintain licensure.

3. Health Informatics Education:

▪ Is considered key components in creating safer hospitals and in improving quality of Care.

4. Curriculum Inventory:

- Learning objectives or competency objectives are operationalized through the definition of a curriculum.
- The Curriculum Inventory Portal uses the Medbiquitous standards.

5. Consumer Health Education

- Computers can be used to print information about medications, illnesses, and symptoms so that patients leave the office with a personalized handout that they can read at home.
- An important role for the health care provider today is to suggest high-quality Web sites that can be trusted to provide valid information ex: Medline Plus, WebMD.

The Ecosystem of Computers in Health Sciences Education

1. **Accessing Learning Content (The Web):**
   a. Eighty percent of Internet users look online for health information
   b. Medscape's professional site, emedicine, makes available detailed, professionally authored summaries of all major diseases and their management. Collections such as Up-To-Date and
   c. Ovid provide integrated access to a selection of journals and books to which the institution
   d. chooses to subscribe.
   e. The electronic medical record (EMR) has the potential to be a point-of-service learning tool for much of this information.
   f. EMR supports "just- in -time learning" within the context of patient care.
   g. Some EMR products support interfaces to third party knowledge products. An example, Infobuttons, provide context-specific links from one information system, such as the EMR, to some other resource that provides relevant information.

2. **Accessing Learning Content: Learning Centers.**

3. **Accessing Learning Content: Simulation Centers**: A simulation center is a specialized type of learning center, though its governance may reside in an academic department such as anesthesiology or surgery depending on the center's origin and history. Immersive, simulation-based learning is a bridge between classroom learning and real clinical experience.

   ▪ Adequate support of a simulation center requires: highly specialized staff, Simulation programmers, Instructional designers, Business managers and trained faculty members

4. **Standards for Learning Objects:** Content Object Reference Model (SCORM) is a collection of standards and specifications that supports exchange of information between the client and the host.

The Ecosystem of Computers in Health Sciences Education

4.

5. **Creating Learning Content:**
    - Technology-enabled learning content is now delivered across many platforms, ranging from the mobile phone and the tablet, through laptops and the Web, to physical manikins and game-like virtual worlds.
    - Creation of technology-enabled content can be labor intensive and time consuming and, hence, needs careful consideration**. Three steps that should be considered are:**
        1. **Needs assessment:** Defining the need for computer- based teaching in the curriculum is the first step.
        2. **Formative evaluation:** Prototyping, rapid iteration of development cycles, and formative evaluation are essential in creating a useful learning product
        3. **Summative evaluation:** after the product is in use, is valuable both to justify the completed project and to learn from one's mistakes

Future Directions and Challenges

- Most faculty members are interested in finding out how technology can help them become better teachers. Most students, on the other hand, want to know how computers can help them learn more efficiently and effectively
- Answers for those questions are:
    1. Comparing educational software at three increasingly granular levels:
        1. configuration "big picture" of how the software is used, for instance as a tutorial or to support small group learning.
        2. instructional method, i.e. the techniques that support learning processes, such as questions, simulations and interactive models.
        3. presentation, i.e. The detailed attributes of how a particular instructional method is presented to the learner.
    2. Continue to identify which unique types of learning outcomes educationa software can support.
    3. "Just-in-time" learning.
    4. Consider the information infrastructure for learning and professional development from the learner's perspective.

Questions

1-A gastroenterologist consultant gave a 3rd year medical student a very interesting case. He discussed with them the history,physical examination and the treatment plan. What type of theories of learning is this:
A-Behaviorism
B-Constructivism
C-Cognitive science
D-Drill and practice

2-DXR is considered what type of computer -based learning :
A-Exploration
B-lecture
C-Learning through design
D-Simulation

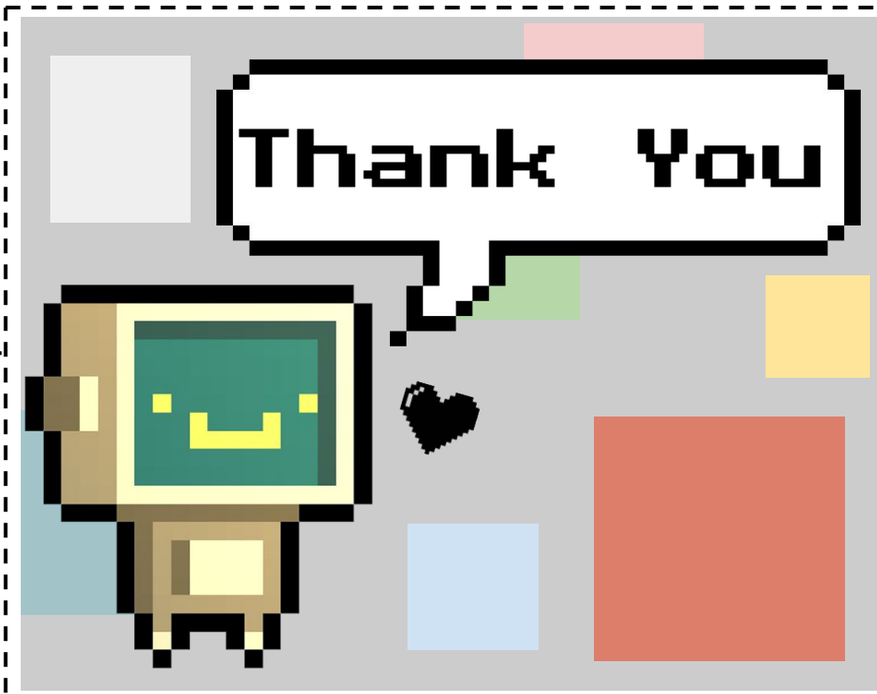
3-Dr.Najeeb videos consider as which type of computer based learning:
A-Digital lectures
B-Didactic lectures
C-static
D-Dynamic

4- PBL is applying which of the following theories?
A- learn by looking at the observable behaviour
B- Cognitive Science
C- Constructivism
D- one way teaching

5- is a collection of standards and specifications that supports exchange of information between the client and the host:
A- Consumer Health Education
B- Teaching Strategies
C- Content Object Reference Model
D- Electronic Medical Record

6- Which ONE of the following consider as uses of Technology to Support Learning:
A- Health Informatics Education
B- Scenario, Case and Problem- Based Learning
C- both

1) B
2) D
3) A
4) C
5) C
6) A



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