Medical Education Journal Club

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Name	Role	Disclosure / Resolution
Carla S. Lupi	Activity Director/Planner/ Speaker	Dr. Lupi reports no relevant financial relationships.
Vivian Obeso	Planner/Speaker	Dr. Obeso reports no relevant financial relationships.
Christian Castro	Planner	Mr. Castro reports no relevant financial relationships.
Melissa Ward-Peterson	Planner	Ms. Ward-Peterson reports no relevant financial relationships.

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Learning Objectives

- Be able to list the search results for one medical education database consulted in the design of a course or teaching session.

- Conduct a critical appraisal of an article in the medical education research.

- Identify the applicability of research results to one's own course or teaching session.

Medical Education Journal Club

- Establish a forum for faculty to share and discuss recent literature in medical education

- Use best evidence in medical education literature to evaluate and advance current practices in our educational program

- Establish a culture that promotes curricular innovation and change in an evidence-based manner

- Stimulate educational scholarship

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Please complete the CME survey to receive credit for attendance.

E-Learning

MEDICAL TEACHER

AMEE Guide 32: e-Learning in medical education
Part 1: Learning, teaching and assessment

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[1]Northern Ontario School of Medicine, Canada, [2]ITHealthEd, Köstendorf, Austria

Overview

- Learning and e-learning

- ePBL

- Facilitating online learning

- FIU HWCOM e-learning

- e-Assessment

Technology

- Greek
  - *techne:* "art, skill, cunning of hand"
  - *logia:* collection of techniques, methods or processes
- Efficiency and speed
- New ways of thinking and working
- Risks, "trial and error"
- Education, not technology, is primary goal

HUMAN RESOURCES
FOR HEALTH

REVIEW   **Open Access**

E-learning in medical education in resource constrained low- and middle-income countries

Seble Frehywot[1*†], Yianna Vovides[2†], Zohray Talib[1], Nadia Mikhail[1], Heather Ross[1], Hannah Wohltjen[1], Selam Bedada[1], Kristine Korhumel[1], Abdel Karim Koumare[3] and James Scott[1]

Abstract

Background: In the face of severe faculty shortages in resource-constrained countries, medical schools look to e-learning for improved access to medical education. This paper summarizes the literature on e-learning in low- and middle-income countries (LMIC), and presents the spectrum of tools and strategies used.

the cross-cutting edge

Applying the science of learning to medical education

Richard E Mayer

OBJECTIVE The goal of this paper is to examine how to apply the science of learning to medical education.

SCIENCE OF LEARNING The science of learning is the scientific study of how people learn. Multimedia learning – learning from words and pictures – is particularly relevant to medical education. The cognitive theory of multimedia learning is an information-processing explanation of how people learn from words and pictures. It is based on the

SCIENCE OF INSTRUCTION The science of instruction is the scientific study of how to help people learn. Three important instructional goals are: to reduce extraneous processing (cognitive processing that does not serve an instructional objective) during learning; to manage essential processing (cognitive processing aimed at representing the essential material in working memory) during learning, and to foster generative processing (cognitive processing aimed at making sense of the material) during learning. Nine evidence-based principles for

Learning

- Change in knowledge attributable to experience

- Knowledge:
  - Facts and concepts
  - Procedures and strategies (skills)
  - Beliefs (attitudes)

- Need to pinpoint the knowledge to be changed

Mayer, R. E. (2010). Applying the science of learning to medical education. *Medical education*, *44*(6), 543-549.

e-Learning

- Pedagogical approach
  - Flexible
  - Engaging
  - Learner-centered
- Interaction
- Collaboration and communication
  - Often asynchronous

Problem-based Learning

- PBL is learner-centered and constructivist
- Group work on problem or case
  - Extraction of key issues and questions
- Individual investigation
- Reporting back to group

Face-to-face Problem-based Learning

- Make cases more realistic
  - videos
- Supplement to face-to-face process
  - Copy of case
  - Supporting material
    - Documents
    - Articles
    - Lecture notes
    - PowerPoint presentations

ePBL

- Case creation and electronic distribution
- Student-student interaction
  - Chat rooms, bulletin boards, email, whiteboards
- Questions to facilitators
  - Chat sessions or bulletin boards
  - Traditional facilitator role or role-play

- Students work individually

Take Home Message: Given the constructivist basis of PBL, e-learning can be used to guide the learner's discovery as well as the unfolding of the case. The teachers and facilitators need to carefully consider the degree of integration, and the variation between blended approaches or entirely online approaches.

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Sections

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📖 Original Paper

Exploring the Efficacy of Replacing Linear Paper-Based Patient Cases in Problem-Based Learning With Dynamic Web-Based Virtual Patients: Randomized Controlled Trial

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and continues to be developed and explored. Challenges include how to connect the somewhat

Virtual Patients

- Open-ended clinical narrative
- Structured patient encounter
- Learner role may vary
- Does not have to be expensive
- Limit distractions
- Judicious use of gaming features
- Linked to didactics or open exploration

- http://verg.cise.ufl.edu/virtualpatientsgroup/
- http://ict.usc.edu/prototypes/virtual-patient/

Facilitating Online Learning: Text Interaction

- Bulletin boards or chat rooms
- "guide on the side" not "sage on the stage"
- Students work through issues
  - Competition, conflict and responsibility
- Take turns as facilitator
- Netiquette
- Strategies to increase participation

Other options

- Audio conferencing
- Video conferencing
- Web conferencing

Multimedia Learning

- Learning from words and pictures
- Verbal learning
  - Printed words
  - Spoken words
- Pictorial learning
  - Static graphics
  - Dynamic graphics

Mayer, R. E. (2010). Applying the science of learning to medical education. *Medical education*, *44*(6), 543-549.

Cognitive Theory of Multimedia Learning

- Dual channels principle

- Limited capacity principle

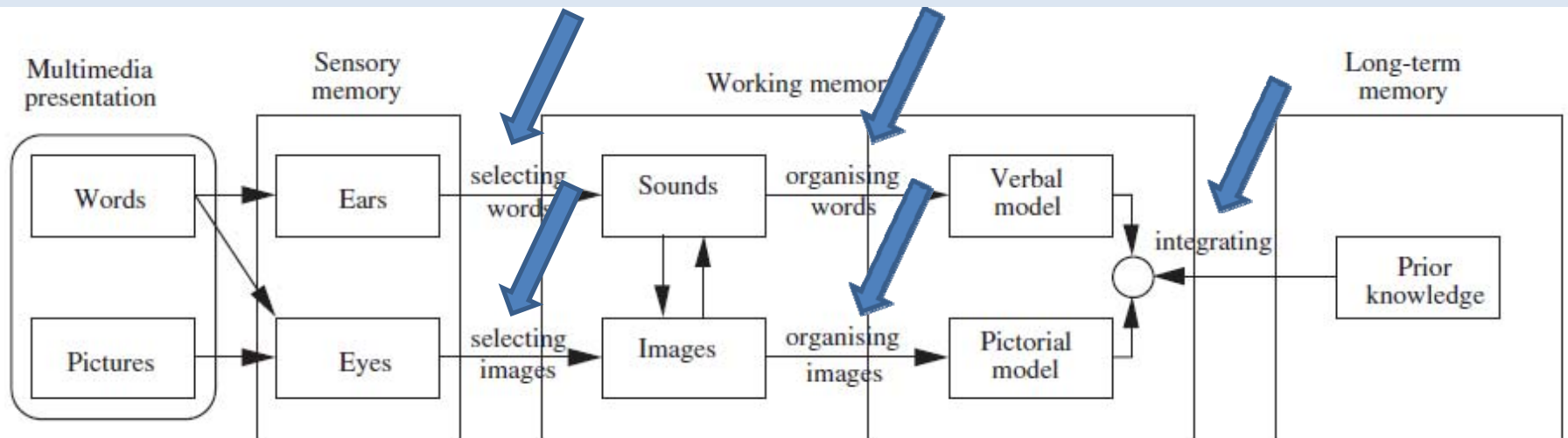- Active processing principle

Types of cognitive process

Figure 1 A cognitive theory of multimedia learning

Instruction

- Teacher's manipulation of the learner's experiences in a manner intended to foster learning
  - Constructing situations to lead to intended change in knowledge
    - Facts
    - Concepts
    - Procedures
    - Strategies
    - Beliefs

Types of Processing

- Extraneous (overactive website) **Reduce**
  - Does not support the learning objective
  - Caused by poor instructional design
- Essential cognitive **Manage**
  - Mentally represent essential material from a lesson in working memory
- Generative cognitive **Foster**
  - Making sense of the presented material
    - Cause by learner's motivation to understand the material

Table 1 Research-based principles for instructional design of multimedia lessons

Principle	ES	Tests
Principles for reducing extraneous processing		
Coherence principle: eliminate extraneous material	0.97	14 of 14
Signalling principle: highlight essential material	0.52	5 of 6
Contiguity principle: place printed words near corresponding graphics	1.19	5 of 5
Principles for managing essential processing		
Pre-training principle: provide pre-training in names and characteristics of key concepts	0.98	3 of 3
Segmenting principle: break lessons into learner-controlled segments	0.85	5 of 5
Modality principle: present words in spoken form	1.02	17 of 17
Principles for fostering generative processing		
Multimedia principle: present words and pictures rather than words alone	1.39	11 of 11
Personalisation principle: present words in conversational or polite style	1.11	11 of 11
Voice principle: use a human voice rather than a machine voice	0.78	3 of 3

ES = effect size

The 7 Habits of Highly Effective eLearning Designers

- Always Be Looking for New Designs
- Plan Ahead
- Simple Graphic Design Goes a Long Way
- Keep Open Communication
- Leverage Talent
- Be Open to Feedback
- Review What You've Learned

http://elearningbrothers.com/the-7-habits-of-highly-effective-elearning-designers/

What are we doing at ![FIU | Herbert Wertheim College of Medicine] ?

- SBAR Module:
  https://ilearn.courses.med.fiu.edu/misc/sbar_student_training_2018/story.html
- This module has interactive slides, voice-over audio, video, and interactive videos.
-
- Radiology Module "Mammography" (still in development):
  https://ilearn.courses.med.fiu.edu/Review_Folder/introduction_to_mammography_review2/story.html
- Linear e-learning module
-
- Radiology Module "Basics of Medical Imaging" (still in development):
- https://ilearn.courses.med.fiu.edu/Review_Folder/Basics_of_Medical_Imaging_review/story.html
- non-linear e-learning module
-
- Quizmaker quiz:
  https://ilearn.courses.med.fiu.edu/misc/BCC_7210/GI_Anatomy_Quizmaker/quiz.html
- Example of interactive quiz created using Quizmaker

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E-Learning in Medical Education SIG

Home

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Membership to Special Interest Groups is open to all APA members.
To join a SIG, click here

SIG Description
E-Learning is defined as any type of learning that is enabled or delivered to learners by Internets and Intranets or other types of computer networks. In recent years e-Learning environments have begun to incorporate web

SPECIAL INTEREST GROUPS

- A-D
- E-H

  - E-Learning in Medical Education
  - Emergency Medicine
  - Environmental Health
  - Ethics
  - Evidence Based

Testimonials

"It was refreshing to find that the challenges I face in medical education are experience by my peers elsewhere."

Jeff Hamdorf, M.D. Ch.B., Director, Clinical Training & Education, University of Western Australia

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> Overview

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http://www.elearnhub.org/education-and-technology-conferences-january-to-june-2015/

e-Assessment

- Planning
  - Forms of assessment required
  - Relation to immediate L.O.s and rest of curriculum
  - How (if) to complete electronically
- Formative
  - Traditionally knowledge-based
  - Self-directed virtual patients
- Summative

e-Assessment

- Advantages
  - Instant marking and feedback
  - Greater tracking and transparency
  - Reuse and analysis across assessments
  - Greater collaboration
- Disadvantages
  - Support and resources
  - Formatting limitations
  - Risk of technical failures
  - Equipment