Technology Curious Questioning Team

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1. Describe any curricula (not limited to medical schools) that utilize a component of online learning that would support the vision of physicians of 2035+.

Summary of research:The integration of online learning components in medical education has taken off in the last few years. Innovations in technology and the changing landscape of healthcare are pushing medical educators to curate and integrate online learning tools into their curriculum.

Recommendations: The team asserts that we need to critically evaluate how early learners (elementary and middle school) are using technology in their education today in order to stay ahead of the game.

1. Massive Open Online Courses (MOOCs)
    a. MOOCs are educational platforms that provide access to online learning material (sessions, courses, etc.) which can employ videos, quizzes, discussion forums, etc.
    b. The material is on-demand allowing students to utilize it at any time, and at their own pace.
    c. Utility in offloading of classroom and prework content
2. Mobile Learning and Microlearning content for mobile devices.
    a. Allows students to access bite-sized content including video summaries, flashcards, quizzes, etc on their mobile devices.

Pros:

- MOOCS and microlearning platforms are living resources
- Effective use of fragmented periods of time
- Could consider having students curate
    - Would reinforce material for student creators
    - Would incorporate "millennial talk" and best learning practices for this generation of learners
    - Would allow students to use technology to take charge of their own learning

Challenges:

- May result in fatigue from computer-based training
- Needs to have interactive component or risk falling flat and reducing motivation to learn
- Buy or build-
    - Not a lot of good buying options
    - Heavy lift for building own library

2. What new technologies, available now and on the horizon, are/will be important for patient care in 2035+?

Summary of research:

Artificial Intelligence (AI) is a disruptor and already being used in healthcare. It is expected to play an even greater role in the future.

Robotics is already playing a role in surgical procedures and will likely continue to have a significant place in healthcare of the future. Surgical robots enable minimally invasive procedures, offering improved precision, and faster recovery times.

Virtual Reality (VR) provides an immersive training experience for students to practice clinical skills in realistic environments.

Augmented reality (AR) can be used in surgical training as it allows surgeons to overlay digital information (e.g., imaging).

Recommendations:

1. AI
   a. It is imperative that our students become familiar with its use, how to "work with" AI, and how to critically evaluate its limitations with regards to diagnostics, predictive analytics and patient management.
2. Robotics
   a. It is important for students to develop the understanding of how robots can assist with repetitive tasks and patient monitoring to free up healthcare providers to focus on more complex care.
   b. Students can be introduced to the technical aspects of using robots in procedures.
3. AR technology
   a. Introduction to use in anatomy and surgical clinical experiences
4. VR technology
   a. Can be used to simulate patient encounters, introduce instruction related to social determinants of health, community health
   b. Can be used as low risk method of procedure training

Pros:

- AI- Synthesize information
- AI- Students can create cases to self-assess/study
- AI- Offload the building of clinical cases for faculty
- AI-Interface with other software (Docs GPT)
- AR-Create anatomical images
- VR-Recognize novel problem as something they have seen before/where prior knowledge applies in situations they haven't seen before

- AI, VR, AR- can be used for assessment

Challenges:

- Requires addressing regulatory considerations
- Data privacy concerns
- Interoperability
- New training of current healthcare professionals
- Cost

3. In a landscape filled with technology, what are models/best practices to maintain a personal experience when interacting with an individual/patient

Summary of research: Technology can be integrated into patient interactions to enhance communication, assist with administrative tasks (allowing more time for patient interaction), collect data and improve access to information. Technologies such as AI scribes and BioSensors can provide more streamlined patient care experiences eliminating distractions such as electronic charting and providing quick access to computer analyzed patient data.

 Recommendations:

1. Biosensors-
   a. Students should be familiar with how to utilize biosensor data to monitor patients' health care, adherence to treatment, progression of disease, etc.
2. A/I scribe utilization may allow better communication skills training

Pros:

- AI scribes can interface with EMR
- AI scribes may allow for more engaging/conversational interactions with patients (no EMR distractor)
- Biosensors are useful for building a picture of a patient's life outside of single visit snapshot (can employ in longitudinal patient care experiences for students)

Challenges:

- Need buy-in to use the technology
- Learning curve for faculty and students
- Real time information overload
- Real time data management
- AI scribes may negatively impact student documentation skills
- High cost may create equity issues for patients

4. What technology is/can be used to engage individuals and/or groups of people in learning and/or in assessing the skills learned in the curriculum (within and beyond medical education)?

Summary of research:

Digital human anatomy platforms can provide 2 D and 3 D applications for highlighting critical structures and improving procedure skills training. Artificial Intelligence (AI) driven virtual reality simulations can be used to provide an immersive experience for students to practice their clinical skills. Speech analysis software can be used in conjunction with communications curricula to assess students' communication skills and empathy.

Recommendations:

1. Digital human anatomy platforms
   a. may supplement but not replace learning on human cadavers
2. A/I driven virtual reality simulations
   a. may be an adjunct to authentic patient care experiences providing a low risk environment when practicing high stakes tasks (procedural skills)
3. Communication skills analysis platforms
   a. Can be used as adjunct to authentic patient experiences to easily and quickly collect/ analyze vast amounts of data on clinical skills performance

Pros:

- Immersive and engaging learning experience
- May be logistically easier than hiring and training standardized patients
- May provide more uniform experiences
- Can simulate surgical procedures
- Can interact with 3-D anatomy
- Repetitive practice
- Low-stakes

Challenges:

- Limited realism
- Lack of tactile experience (anatomy software)
- Selection and implementation of these technologies must align with our specific learning objectives
- These technologies can help to assess students' clinical/communication skills but should be used in conjunction with in-vivo assessment methods

- Cost
- Training

5. What new products/learning management systems/etc. should we consider to optimize user (student, faculty, staff, leadership) experience?

Summary of Research:
IPAD (Apple technology) can provide a single platform to integrate classroom medical education content, clinical education, assessment and data analysis.

Recommendations:
Consider purchase of Ipads for incoming students to use throughout the four year for both foundational science education and clinical education

Pros:
- Equitable access to learning tools pre purchased by SOM and installed on device (e.g., Complete Anatomy, Sketchy, Visual dx, Anki, Amboss, Aquifer, Poll everywhere, Osmosis)
- Can be used to support anatomy lab
- Can be used to facilitate POC ultrasound (Butterfly IQ and ultrasound probe)
- Push customized content out to students
- Use in exams (compatible with ExamSoft)
- Collect student data in real time
- Future use in VR/AR
- Use on clerkships in clinical settings (rounding, communication with patients, patient education, real time lab reporting, etc.)
- Integration with EMR

Challenges:
- Cost
- Need to sync with technology at Northwell