Developing an iBook to Enhance Clinical Education

Lori A Bolgla, PT, PhD, MAcc, ATC

Health Sciences Education Grand Rounds

June 17, 2016

First Things First

What do a physical therapist and 3 faculty at the Dental College of Georgia have in common?

A true appreciation of the value of eLearning…

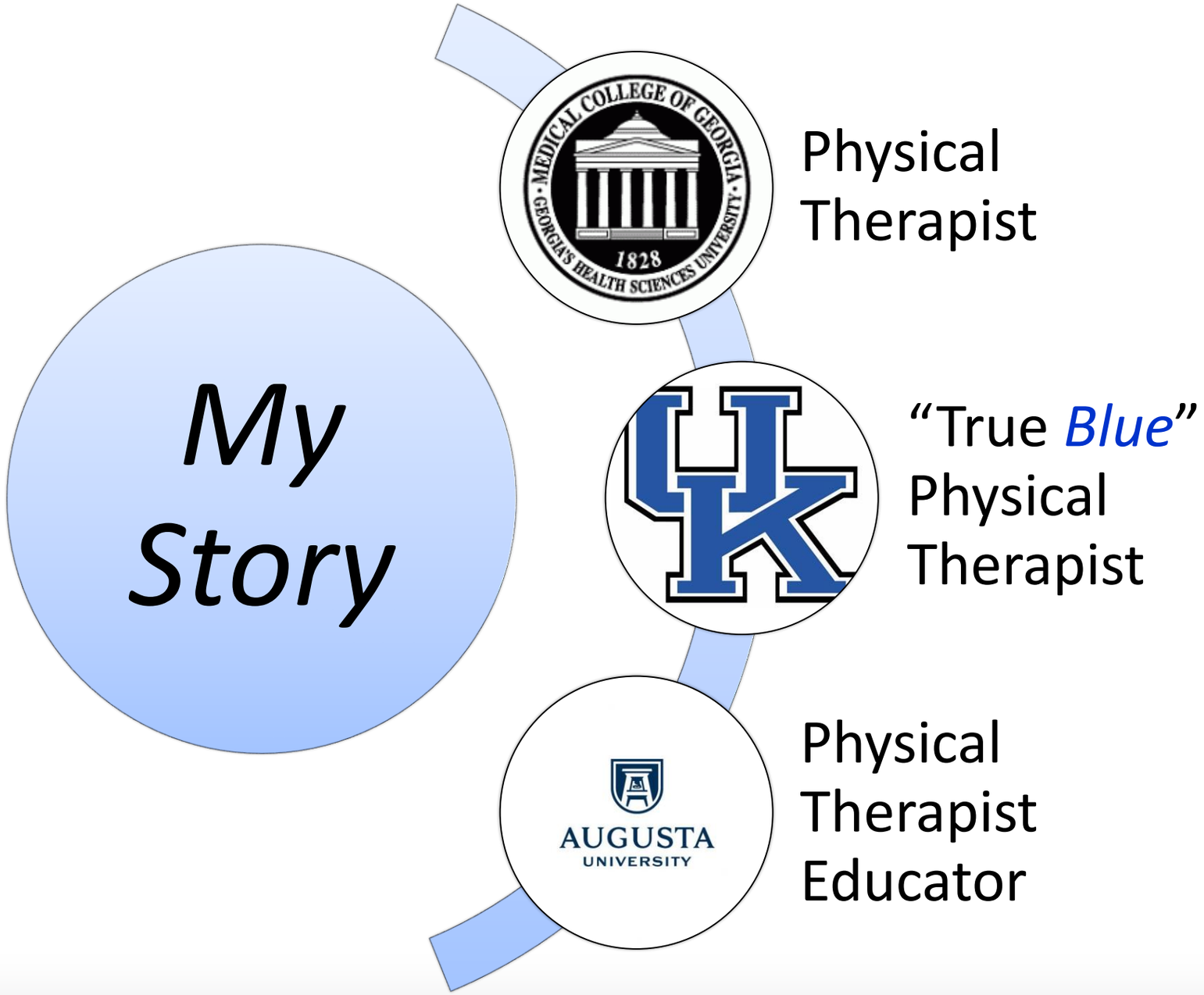
Richard S Callan, DMD, EdS (use of simulation)

Alan R Furness, DMD (use of simulation)

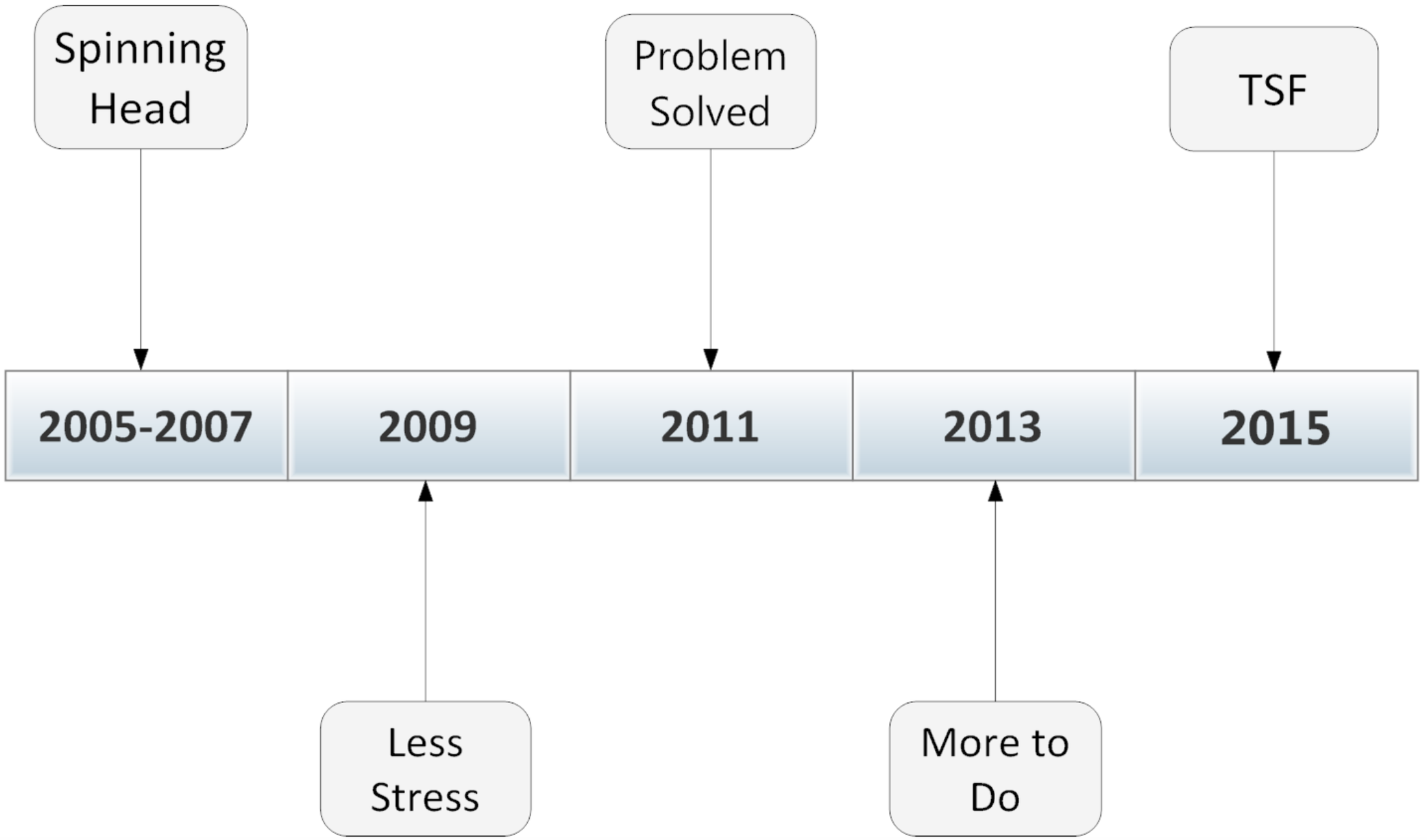
Jan K Mitchell, DDS, MEd (use of interactive PDFs)

Thank you for allowing me time to share my story for the development and implementation of iBook use!

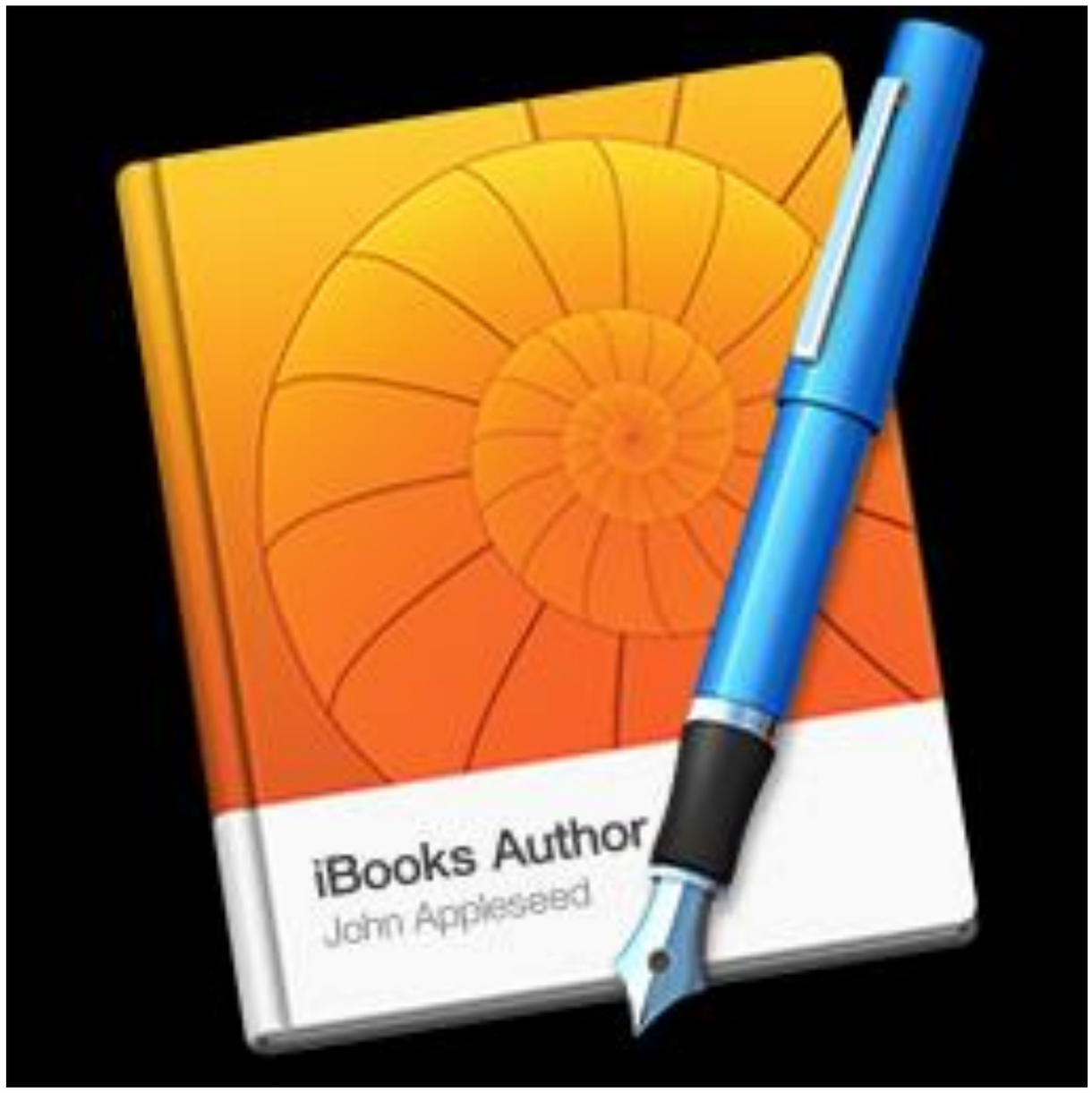
Background


My Story
Physical Therapist
“True Blue” Physical Therapist
Physical Therapist Educator

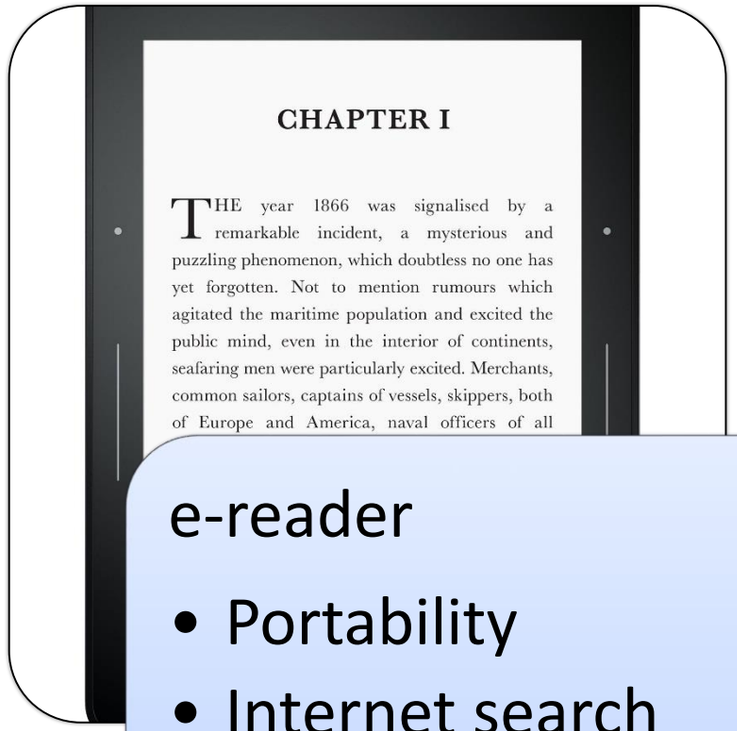
Background


Spinning Head
Problem Solved
TSF
2005-2007
2009
2011
2013
2015
Less Stress
More to Do

iBooks Author



e-reader versus iBook



e-reader

- Portability
- Internet search capability
- Rigid document

iBook

- Easy accessible
- Modifiable
- Interactive
- More visually appealing

iBook…beyond text, pictures, figures, and tables

Measure of Confidence

(Pre-Presentation)

Session Objectives

- Stimulate interest for the use of iBooks in health sciences education
- Identify benefits and challenges associated with iBook use
- Provide strategies for the development and implementation of iBooks for health sciences education
- Identify resources at Augusta University that can promote the use of iBooks

Session Overview

Literature Review

- *Others' Experiences with iBooks*

Tips for Success

- *My Experience*

Future Endeavors

- *Spreading the Word*

Review of the Literature

Multimodal Learning Through Media: What the Research Says

By Metiri Group – Commissioned by Cisco

Contacts:

Charles Fadel, Global Lead, Education; Cisco Systems, Inc.: cfadel@cisco.com

Cheryl Lemke, CEO, Metiri Group: clemke@metiri.com

Multimedia Principles: “Thumbs-Up” for iBook Use

Principle	Rationale
Multimedia	Words and pictures improve retention
Spatial Congruity	Close proximity between words and pictures
Temporal Congruity	Simultaneous presentation of words and pictures
Coherence	Minimizes extraneous words and pictures
Modality	Incorporates animation and narration instead of only text
Direct Manipulation	Ability to change the complexity of the material

Article types
Clinical Trial
Review
Customize ...

Text availability
Abstract
Free full text
Full text

PubMed Commons
Reader comments
Trending articles

Publication dates
5 years
10 years
Custom range...

Species
Humans
Other Animals

Clear all

Show additional filters

Summary Sort by Most Recent Send to:

Search results

Items: 5

Did you mean: ***book*** (43210 items)

1. Exploring medical undergraduates' perceptions of the educational value of a novel ENT **iBook**: a qualitative study.
   Al-Hussaini A, Tomkinson A.
   J Vis Commun Med. 2016 May 31:1-7. [Epub ahead of print]
   PMID: 27244458
   Similar articles

2. Mobile technology: Creation and use of an **iBook** to teach the anatomy of the brachial plexus.
   Stewart S, Choudhury B.
   Anat Sci Educ. 2015 Sep-Oct;8(5):429-37. doi: 10.1002/ase.1501. Epub 2014 Oct 28.
   PMID: 25351850
   Similar articles

3. Validation of an iPad test of letter contrast sensitivity.
   Kollbaum PS, Jansen ME, Kollbaum EJ, Bullimore MA.
   Optom Vis Sci. 2014 Mar;91(3):291-6. doi: 10.1097/OPX.0000000000000158.
   PMID: 24413274
   Similar articles

4. Using the **iBook** in medical education and healthcare settings--the **iBook** as a reusable learning object; a report of the author's experience using iBooks Author software.
   Payne KF, Goodson AM, Tahim A, Wharrad HJ, Fan K.
   J Vis Commun Med. 2012 Dec;35(4):162-9. doi: 10.3109/17453054.2012.747173.
   PMID: 23278413
   Similar articles

5. Development of instructional, interactive, multimedia anatomy dissection software: a student-led initiative.
   Inwood MJ, Ahmad J.
   Clin Anat. 2005 Nov;18(8):613-7.
   PMID: 16187304
   Similar articles

Did you mean: ***book*** (43210 items)

Summary Sort by Most Recent Send to:

Filters: Manage Filters

Find related data
Database: Select
Find items

Search details
iBook[All Fields]
Search
See more...

Recent Activity
Turn Off Clear
iBook (5)
PubMed
See more...


CANADA
Edmonton
Vancouver
Regina
Winnipeg
Québec
Ottawa
Montréal
Seattle
Olympia
Washington
Salem
Oregon
Montana
Helena
Idaho
Boise
North Dakota
Bismarck
South Dakota
Pierre
Minnesota
St. Paul
Wisconsin
Michigan
Toronto
Maine
Augusta
Montpelier
Vt.
Concord
Albany
Boston
Mass.
New York
Providence
R.I.
Hartford
Conn.
New York
Trenton
New Jersey
Dover
Delaware
Annapolis
Md.
Washington, D.C.
Wyoming
Cheyenne
Nebraska
Lincoln
Iowa
Des Moines
Madison
Lansing
Detroit
Chicago
Pennsylvania
Philadelphia
Harrisburg
Ohio
Columbus
Indiana
Indianapolis
Illinois
Springfield
West Virginia
Charleston
Richmond
Virginia
Frankfort
Kentucky
Nashville
Tennessee
Raleigh
North Carolina
Columbia
South Carolina
Atlanta
Georgia
Memphis
Arkansas
Missouri
St. Louis
Jefferson City
Kansas
Topeka
Oklahoma
Oklahoma City
Denver
Colorado
Utah
Salt Lake City
Nevada
Carson City
Las Vegas
Sacramento
San Francisco
California
Los Angeles
Arizona
Phoenix
Santa Fe
New Mexico
Mexicali
Hermosillo
Chihuahua
MEXICO
Monterrey
Texas
Dallas
Austin
Houston
Louisiana
Baton Rouge
New Orleans
Mississippi
Jackson
Alabama
Montgomery
Tallahassee
Florida
Miami
Gulf of Mexico
THE BAHAMAS
Nassau
North Pacific Ocean
North Atlantic Ocean
★ National capital
U.S. State
State capital
Scale 1:13,500,000
Albers Equal-Area Projection
0
500 Kilometers
0
500 Miles

The *Dartmouth College* Experience

- All first year medical students receive an iPad
- 2nd year Cardiology curriculum
  - *Integrate key concepts from lecture notes and PowerPoint illustrations*
  - *Used videos of electrocardiograms and audio for heart sounds and murmurs*
  - *"The iBooks were incredible. The integration of pictures and audio files for the heart murmurs made for an excellent studying resource"*
  - *"The iBook is the perfect modality for presenting information, as it seamlessly blends notes and slide."*
  - *"They could be improved by incorporating 'test your understanding' questions along the way. It would break them up a bit and help to reinforce important concepts."*

https://sites.dartmouth.edu/library/2014/02/03/faculty-insight-creating-ibooks-for-medical-education/

The *Dartmouth College* Experience

Words of warning…

- *Students will want all the content in this format*
- *Very time consuming and you will find yourself "tweaking" your iBooks*
- *Endless amount of potential for delivering content in a creative way*

"You will not mind spending time at home modifying because it is fun"

https://sites.dartmouth.edu/library/2014/02/03/faculty-insight-creating-ibooks-for-medical-education/

The *Washington University at St Louis* Experience

- Used in the Department of Neuroscience to teach microscopic anatomy
- Key features not captured when converting a textbook to an iBook
  - *Narrated virtual slide-viewing tutorials*
  - *Integrated self-quizzes*
  - *Links to recommended online resources*
- Serves as a lab manual for histology, accompanying text alongside microscope slides
- Allows the instructors to individualize the content

https://medicine.wustl.edu/news/school-medicine-scientists-develop-ibooks-medical-classes/

The *University of Arkansas- Fort Smith* Experience

Advantages

- Ease of template use
- Flexibility
- Interactive nature
- Personal delivery of material

Disadvantages

- Need for Mac platform
- Time consuming
- Formatting challenges with static figures

Baldwin A. “Developing an interactive textbook using iBooks author,” *Federation of Business Disciplines Journal*, 3:1-12, 2015

The “Bottom” Line

ORIGINAL ARTICLE

Using The iBook In Medical Education And Healthcare Settings - The iBook As A Reusable Learning Object; A Report Of The Author’s Experience Using iBooks Author Software

KARL FB PAYNE[1], ALEXANDER MC GOODSON[1], ARPAN TAHIM[1], HEATHER J WHARRAD[2] AND KATHLEEN FAN[3]
1. Clinical Fellow in Oral and Maxillofacial Surgery, King’s College Hospital, Denmark, London, UK
2. Professor of e-Learning & Health Informatics, University of Nottingham, UK
3. Consultant in Oral and Maxillofacial Surgery King’s College Hospita, UK

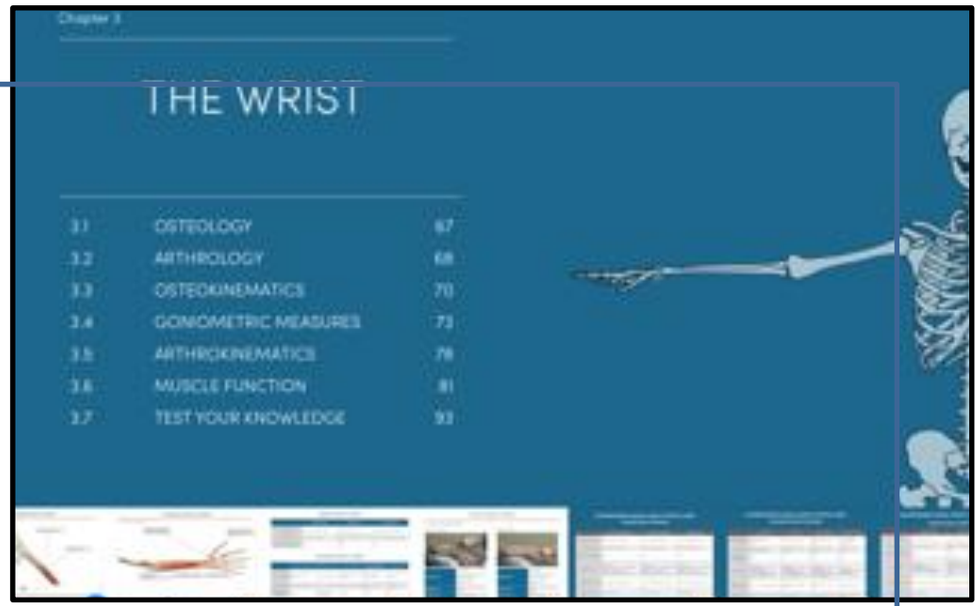
2012

Navigation

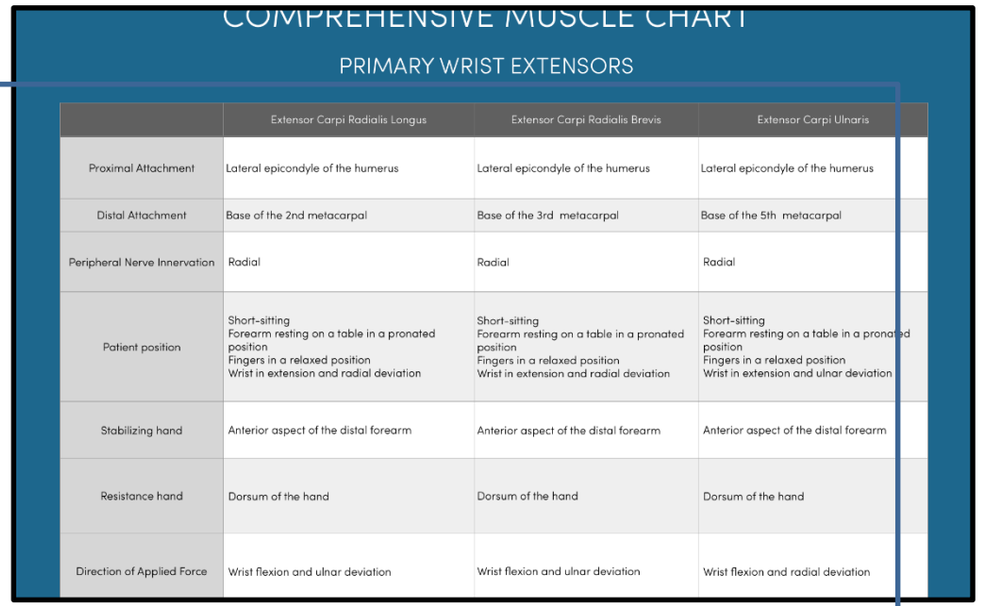
Interactivity

Integration

Assessment



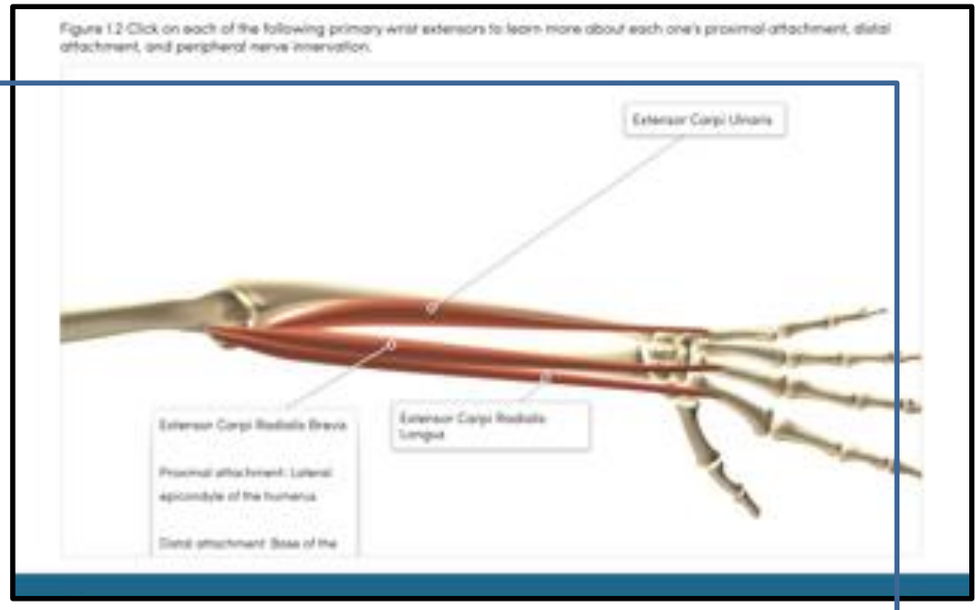
Navigation


COMPREHENSIVE MUSCLE CHART

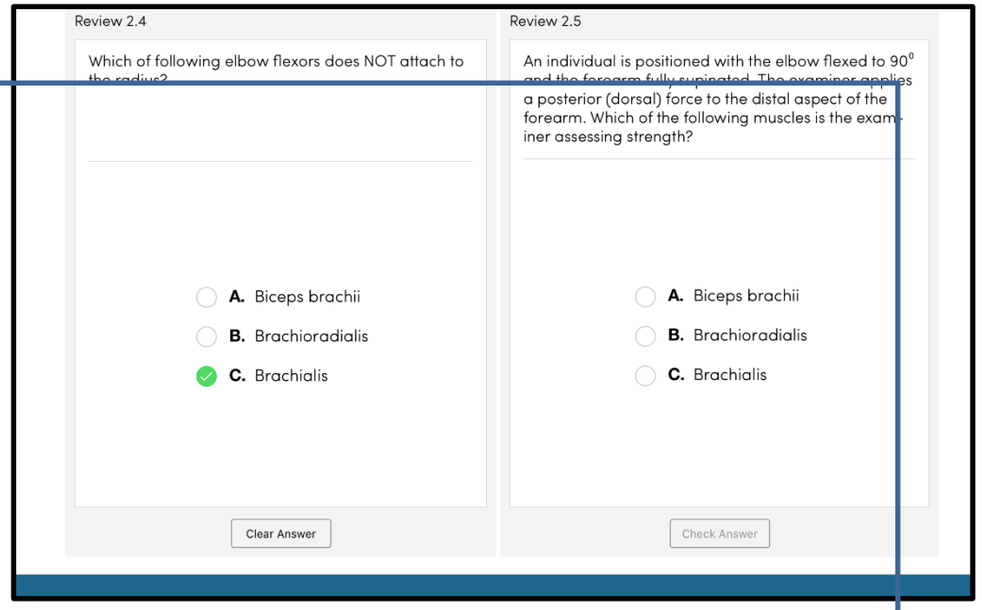
PRIMARY WRIST EXTENSORS

	Extensor Carpi Radialis Longus	Extensor Carpi Radialis Brevis	Extensor Carpi Ulnaris
Proximal Attachment	Lateral epicondyle of the humerus	Lateral epicondyle of the humerus	Lateral epicondyle of the humerus
Distal Attachment	Base of the 2nd metacarpal	Base of the 3rd metacarpal	Base of the 5th metacarpal
Peripheral Nerve Innervation	Radial	Radial	Radial
Patient position	Short-sitting Forearm resting on a table in a pronated position Fingers in a relaxed position Wrist in extension and radial deviation	Short-sitting Forearm resting on a table in a pronated position Fingers in a relaxed position Wrist in extension and radial deviation	Short-sitting Forearm resting on a table in a pronated position Fingers in a relaxed position Wrist in extension and ulnar deviation
Stabilizing hand	Anterior aspect of the distal forearm	Anterior aspect of the distal forearm	Anterior aspect of the distal forearm
Resistance hand	Dorsum of the hand	Dorsum of the hand	Dorsum of the hand
Direction of Applied Force	Wrist flexion and ulnar deviation	Wrist flexion and ulnar deviation	Wrist flexion and radial deviation

Integration



Interactivity



Assessment

Tips for Success

Tip #1: Purpose and Expected Outcome

From PTHP 7222 *(6 credit hours; 135 contacts hours)*

Biomechanics, manual muscle testing, and goniometry

3 cumbersome textbooks with complementary information

Emphasis on psychomotor skills

Tip #1: Purpose and Expected Outcome

- Provide an *interactive* way to reinforce biomechanical principles
- Create a *bridge* from anatomical landmarks and structures to joint and muscle function
- Develop a *single* medium to access information on goniometry and manual muscle testing
- Integrate *videos* to demonstrate correct manual muscle testing techniques
- Incorporate *opportunities* for self-assessment

Roadblock #1: $$$

From: Jones, Jennifer (ELS-OXF)
To: Bolgla, Lori
Cc: Cullum, Ashley; Ekema, Lynsey
Subject: RP014693 Request for permission
Date: Thursday, August 13, 2015 11:16:42 AM

Dear Dr Lori Bolgla

Reference: **KINESIOLOGY OF THE MUSCULOSKELETAL SYSTEM 2/E, 2010, (ISBN 9780323039895), Neumann ed, figures 1-4, 1-8 (A-B), 5-1, 5-7 (A), 5-10 (A-C), 5-11, 5-12, 5-13, 5-14, 5-15, 5-17, 5-19 (A-C), 5-20, 5-21, 5-22, 5-25, 5-30, 5-31, 5-33, 5-34, 5-48, 5-53, 6-1, 6-2, 6-3, 6-16 (A), 6-18, 6-19, 6-20, 6-23 (A-B), 6-24, 6-28, 6-29, 6-31 (A-B), 7-1, 7-3, 7-15, 7-16, 8-3, 8-15, 8-16, 8-17 (A-B), 8-23, 8-24 (A-B), 8-25, 8-28, 8-29, 8-30, 12-1, 12-4, 12-19, 12-20 (A-C), 12-21 (A-B), 12-22 (A-C), 12-27, 12-38, 13-1, 13-2, 13-3 (A-B), 13-4, 13-5, 13-13 (A-B), 13-14, 13-16, 13-17 (A-B), 13-20 (A-B), 13-22, (A-B), 13-23 (A-E), 14-3, 14-9, 14-10 (A-B), 14-11, 14-17 (A-E), 14-8 (A-B), 14-20 (A-B), 14-22 (A-E), (14-26 (A-B), 14-27 (A-J), 14-32, 14-33, 14-35 and 14-36**

Proposed use: To be used in an iBook on the osteokinematic and arthrokinematic concepts.

Thank you for your online permission request form dated 22 June 2015. The fee for granting you permission to use the above material is USD 3556.00.

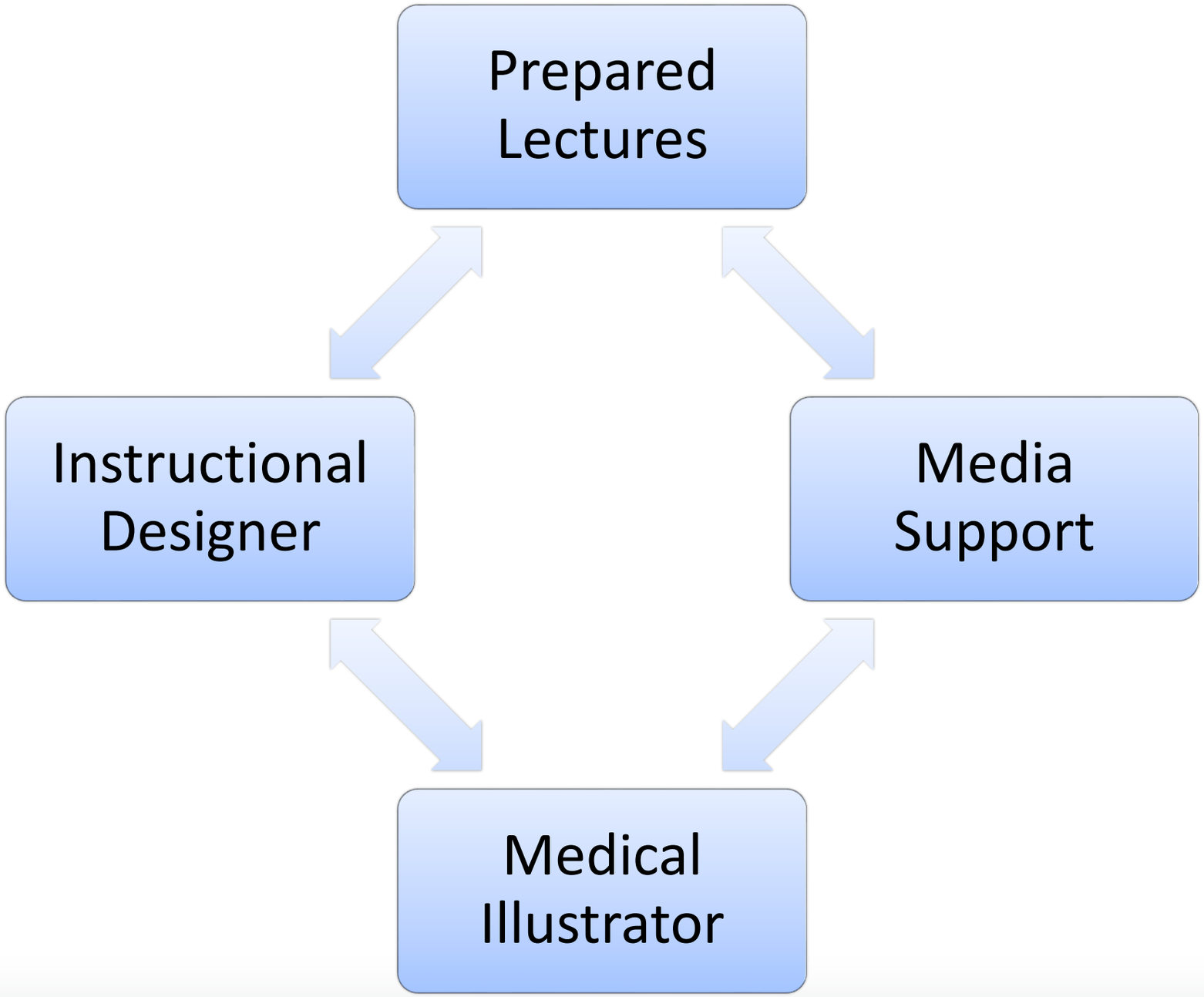
Please note that at this stage you do not have permission to use the material.

Should the fee be acceptable, please let me know and also provide your full mailing address and I will arrange for the necessary invoice to be raised. Once the invoice has been raised the payment due date is final and cannot be extended beyond our standard 60 days.

Please also note that this quote is valid only for a period of six months. After this time you must reapply for permission.

Yours sincerely
Jennifer Jones
Permissions Specialist
Global Rights Department
Elsevier Ltd
PO Box 800
Oxford OX5 1GB
UK

Tip #2: Identify Resources



The best kept secret at Augusta University…

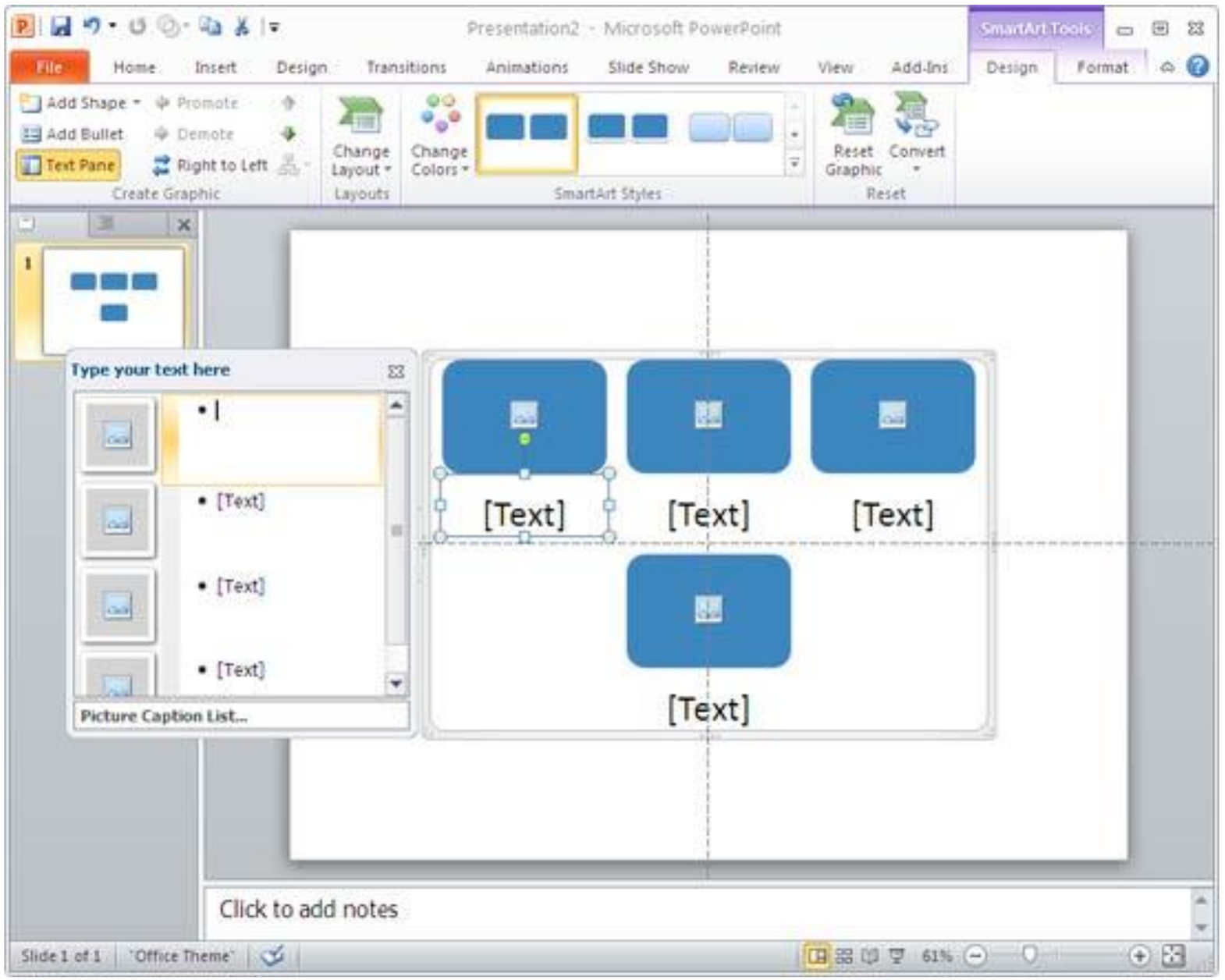
Department of Educational & Collaborative Technology	
Lynsey Ekema	Web/Mobile Application Developer
Ashley Cullum	Senior Instructional Designer
Tim Williams	Instructional Media Specialist
Jeff Mastromonico	Director

Tip #3: Clear Objectives

Wrist	Osteology
	Arthrology
	Osteokinematics
	Goniometric Measures
	Arthrokinematics
	Muscle Function
	Peripheral Nerve Innervation
	Manual Muscle Testing

Chapter Consistency and Logical Progression

Tip #4: Maximize Smart Art



Tip #4: Maximize Smart Art

Fast Facts	The wrist has *2-degrees* of motion
Osteokinematics	Flexion and extension occur in the *sagittal* plane *(assuming anatomical position)*
	Radial and ulnar deviation occur in the *frontal* plane *(assuming anatomical position)*

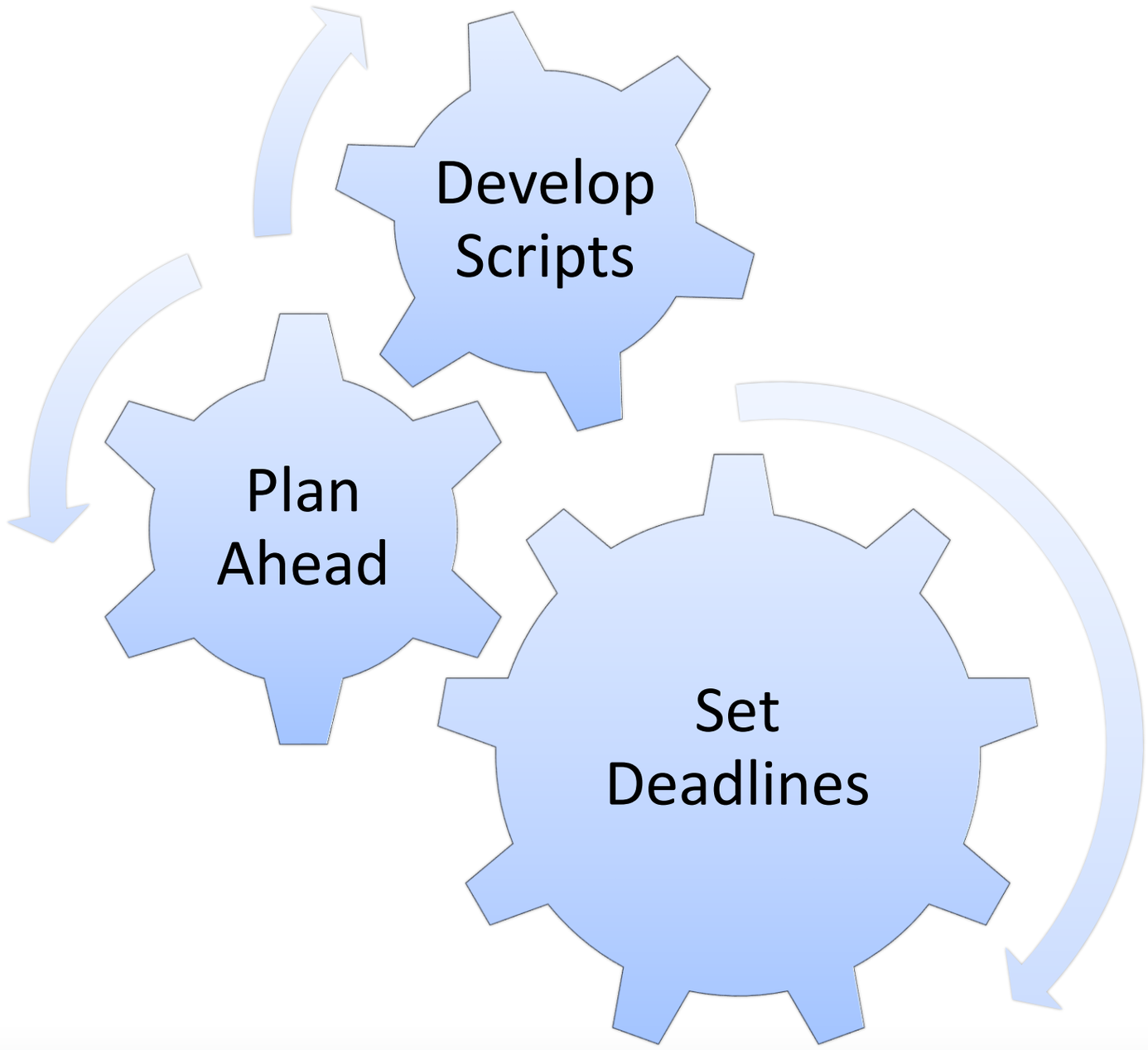
“Steal from Peter to pay Paul”

Tip #5: Liberal Use of Tables

- Great way to summarize information
- Easy to modify for other chapters
- Efficient means for importing information into iBook template
- Provides flexibility in the amount of information presented
  - *Chunks of more succinct, focused information*
  - *Transitioned to comprehensive compilation of information*

Roadblock #2: Time

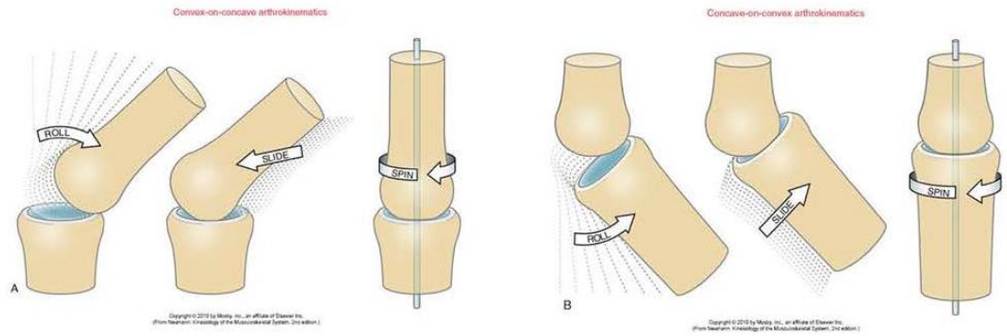
Roadblock #2: Time



Roadblock #2: Time

Arthrokinematics

Remember that the movement also comes from motion between the articular surfaces of the bones. *Arthrokinematics* represents the movements between of the articular surfaces of the joint. Rolling, sliding, and spinning are the main movements and movement of the joint surfaces oftentimes is described as one of the following:



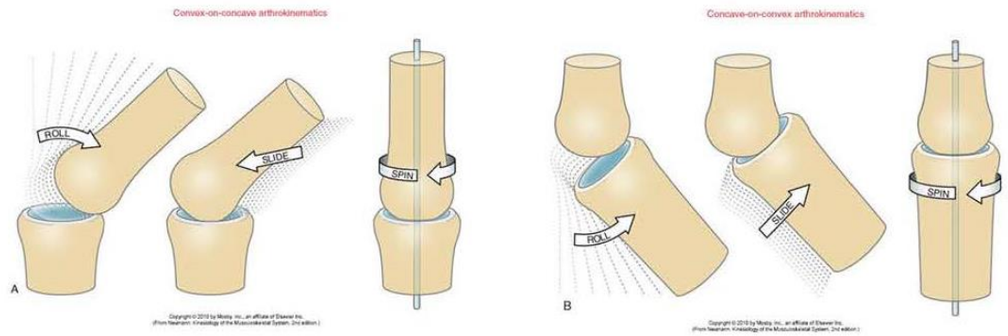
Arthrokinematics at the Radiocarpal Joint

The articulation between the radius and proximal row of carpal bones forms the radiocarpal joint. The distal end of the radius has a *concave* surface; the proximal row of carpal bones has a *convex* surface. The figure below depicts movement of the joint surfaces between the radius and proximal row of carpal bones during wrist extension and flexion. Movement of the carpal bones on the stable radius represents movement of a convex surface on a concave surface. Sliding and rolling of the *convex* carpal bones on the *concave* radius occur in an *opposite* direction. The carpal bones slide in a volar (anterior) direction and roll in a dorsal (posterior) direction during wrist *extension*; they slide in a dorsal (posterior) direction and roll in a volar (anterior) direction during wrist *flexion*.

Arthrokinematics

Remember that normal joint movement depends on motion between the articular surfaces of the bones. Rolling, sliding, and spinning describe movement between articular surfaces necessary for normal joint osteokinematics.

During movement of a concave joint surface on a fixed convex surface, the moving concave surface rolls and glides in the SAME direction. During movement of a convex joint surface on a fixed concave surface, the moving convex surface rolls and glides in the OPPOSITE direction.



Arthrokinematics at the Humeroulnar Joint

The articulation between the humerus and ulna forms the humeroulnar joint. The trochlea of the humerus has a *convex* surface; the trochlear notch of the ulna has a *concave* surface. The figure below depicts movement between the joint surfaces between the humerus and ulna during elbow flexion. Movement of the ulna on the stable humerus represents movement of a concave surface on a convex surface. Sliding and rolling of the *concave* ulnar surface (*the trochlear notch*) on the *convex* humeral surface (*the trochlea*) occur in the *same* direction. The ulna slides and rolls *anteriorly* during elbow *flexion*; it slides and rolls *posteriorly* during elbow *extension*.

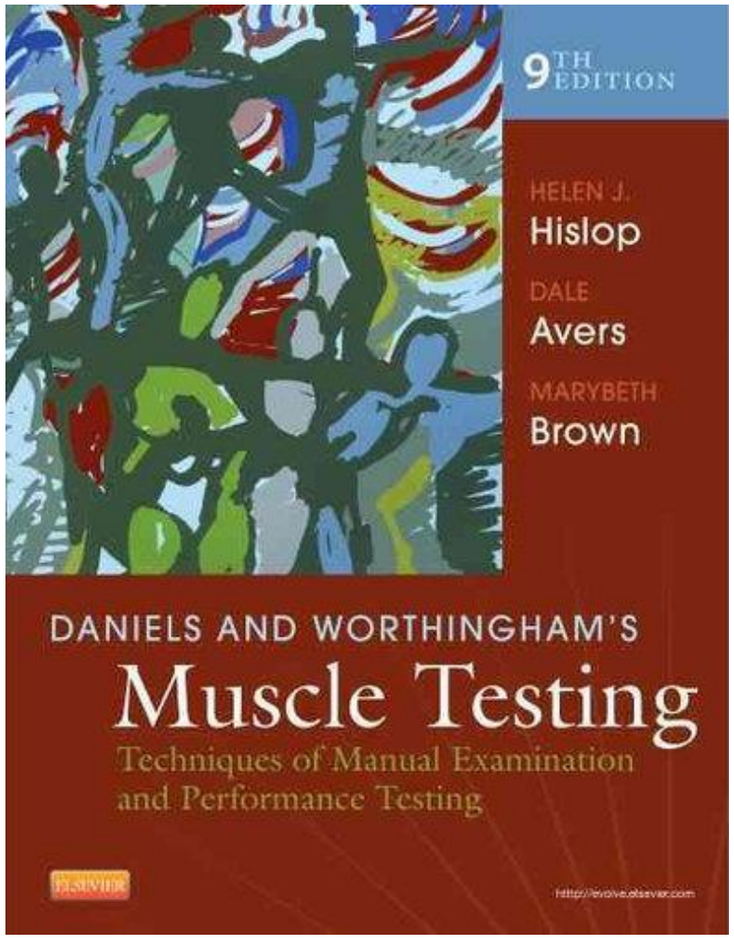
Roadblock #2: Time

Script for the manual muscle testing positions: WRIST EXTENSORS

	Extensor Carpi Radialis Longus/ Extensor Carpi Radialis Brevis/Extensor Carpi Ulnaris
Patient position	Short-sitting Forearm resting on a table in a pronated position
Stabilizing hand	Anterior aspect of the distal forearm
Resistance hand	Dorsum of the hand with fingers relaxed
Direction of Applied Force	Wrist flexion

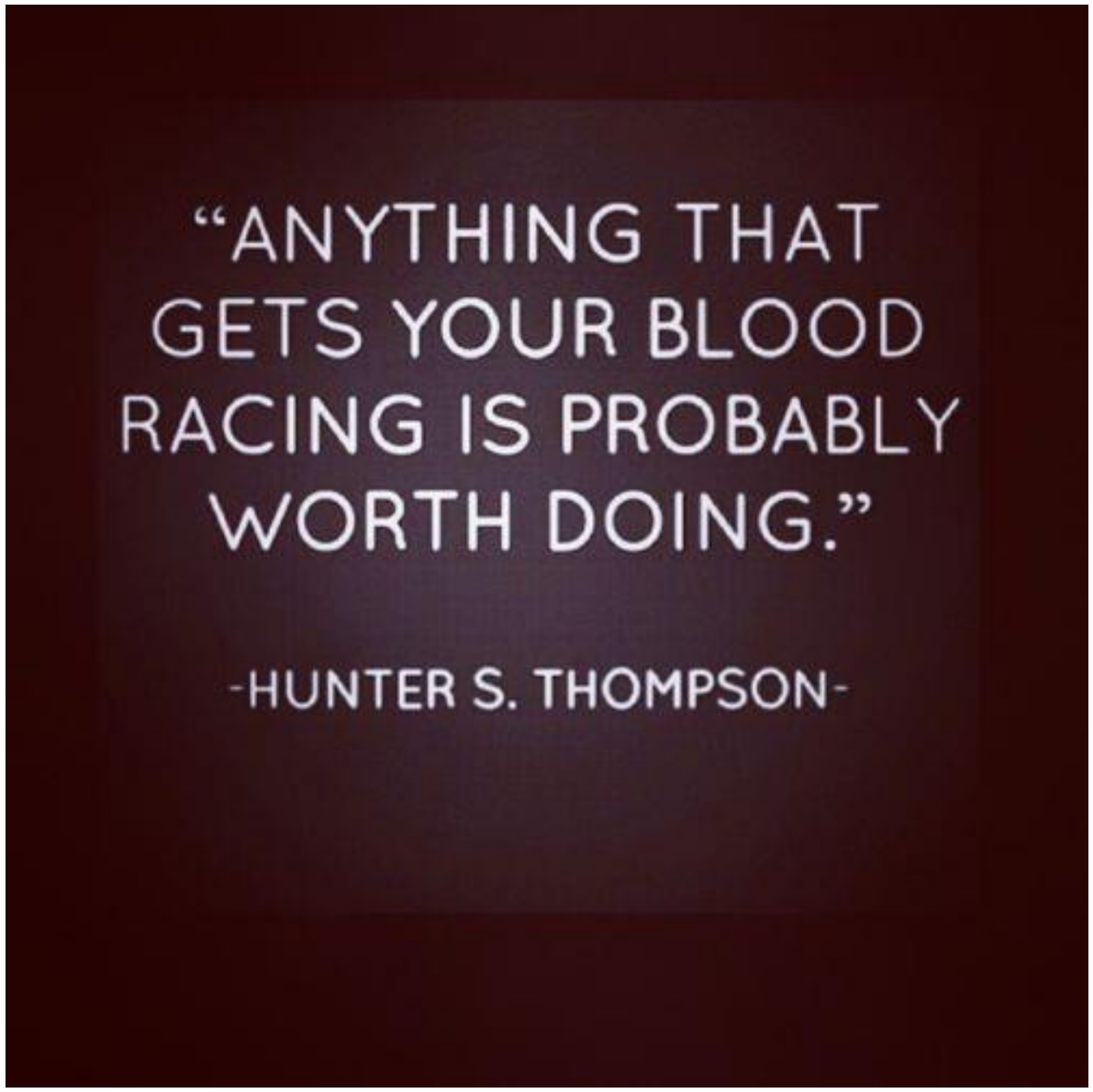
Script for the manual muscle testing positions: PROXIMAL PHALANX FLEXION

	Flexor Digitorum Superficialis
Patient position	Short-sitting Forearm in a supinated position Wrist in a neutral position
Stabilizing hand	Volar aspect of all digits not being assessed
Resistance hand	Volar aspect of the proximal phalanx of the digit being assessed
Direction of Applied Force	Finger extension

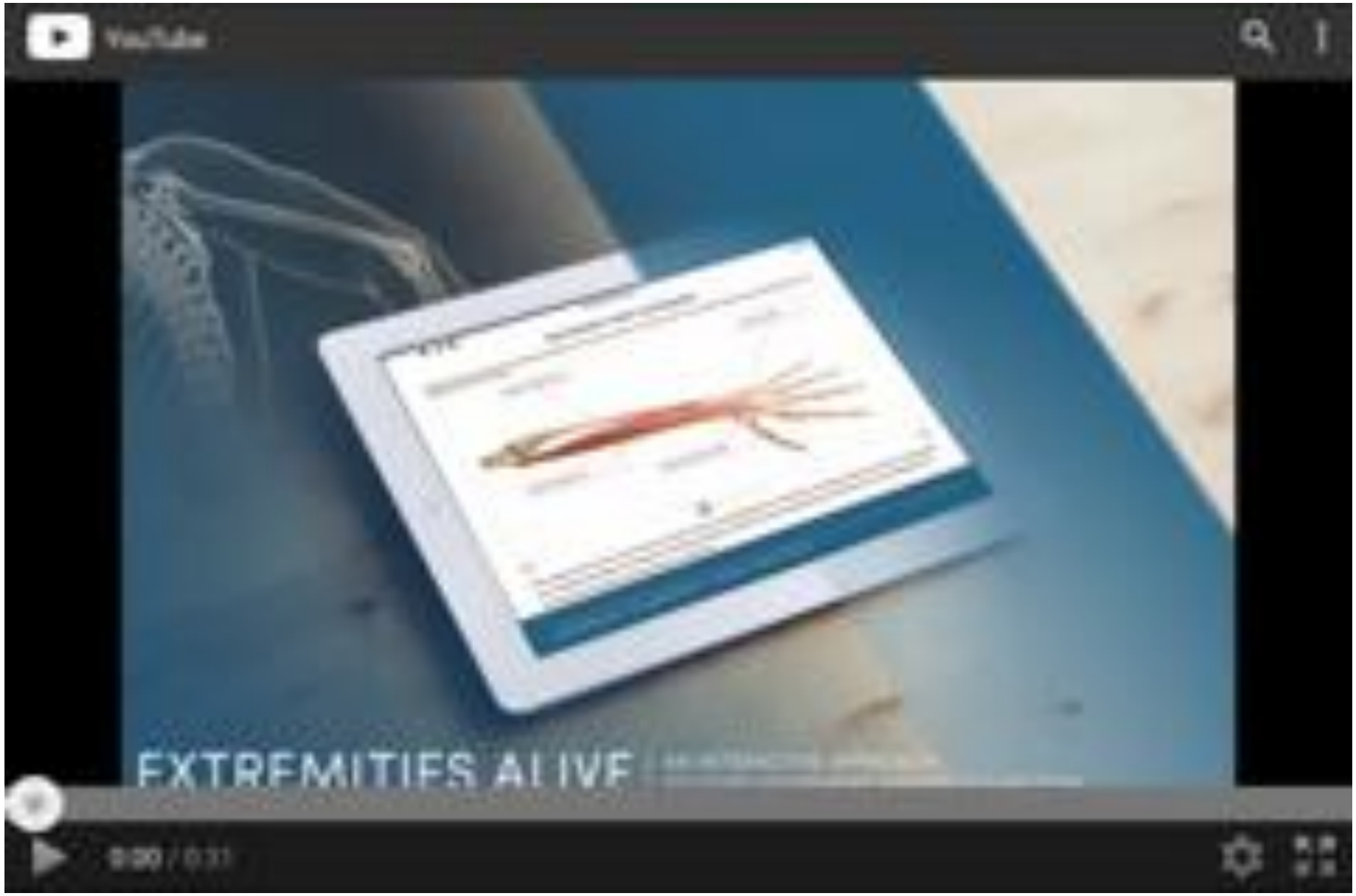


Filmed 31 manual muscle testing techniques in under 2 hours

Tip #6: Commitment and Passion



Final Product Overview



Future Endeavors

Spreading the Word

- Conduct a qualitative study to gather data about advantages and disadvantages of using this iBook across health sciences disciplines
  - *Physical therapy*
  - *Occupational therapy*
  - *Physician assistant*
- Collaboration with other disciplines regarding “special topics”
  - *Dentistry and physical therapy on the management of individuals with temporomandibular problems*
  - *Medical residents and physical therapy for special tests used to determine the appropriate diagnosis for individuals with musculoskeletal problems*

Spreading the Word

MedEdPORTAL | AAMC

Spreading the Word

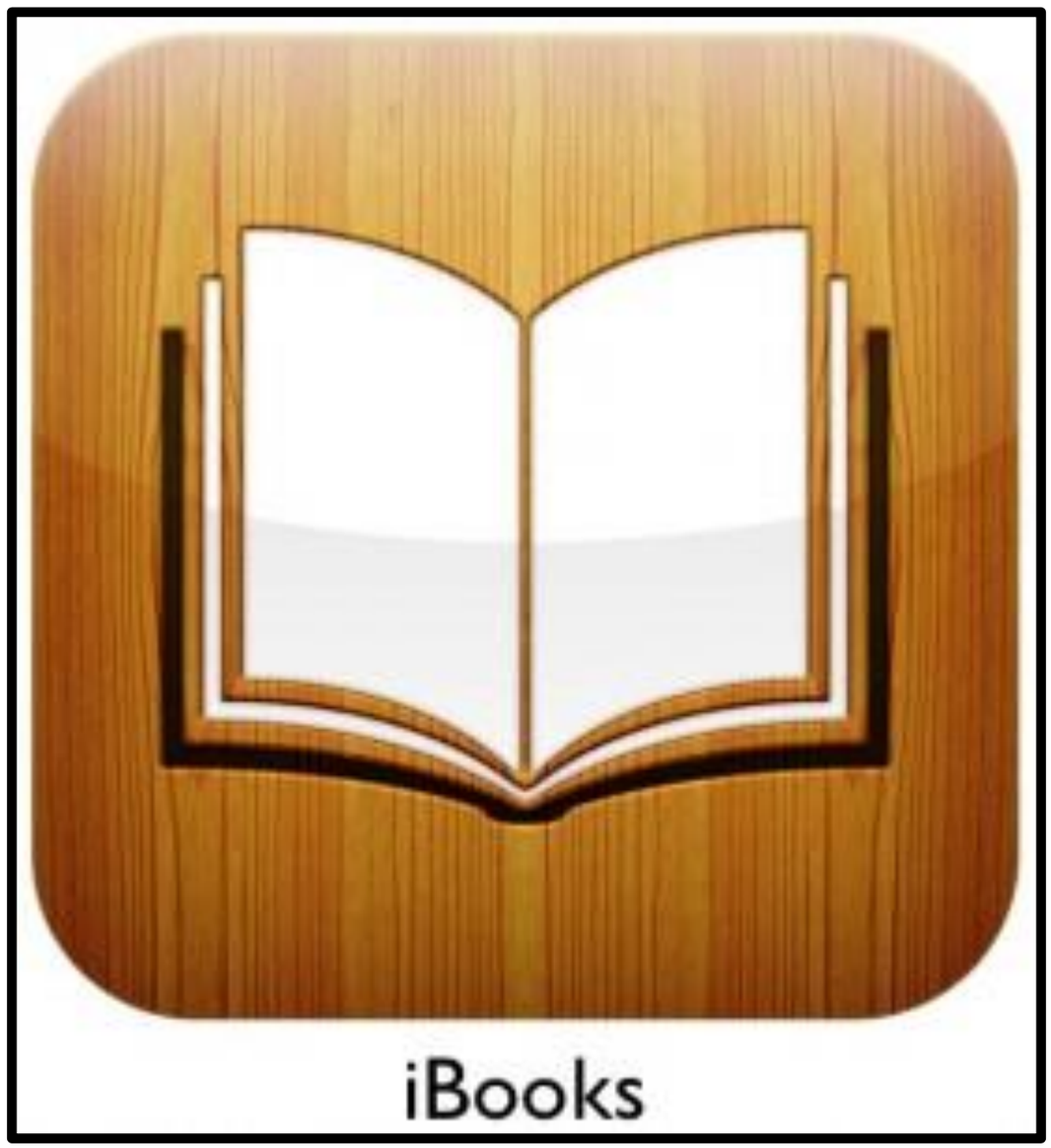
CSU The California State University
WORKING FOR CALIFORNIA

MERLOT

MERLOT

Premiere online international community of faculty, staff, and student
(Users, Members, and Consortium Partners)
from around the world who share their pedagogy and repository-based
Learning Objects, Open Courses, Open Access Textbooks, and Open Access Journal articles

Spreading the Word



Measure of Confidence

(Post-Presentation)

Final word of thanks to *Ralph Gillies, PhD* and *Charlotte Chatto, PT, PhD* for their support and insight