

Making Sense of Student-Generated Co-Curricular Materials

Tales from the Trenches

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Session Objectives

- Describe trends in Web 2.0 technology-enabled learning aids
- Cite examples of several technology tools and products that can enable student learning
- Discuss advantages and disadvantages of student-generated learning aids
- Discuss best practices to facilitate independent student learning via web 2.0 platforms
- Discuss strategies to assess the effect of student-generated study content on learning

Session Outline

- Introduction: Scope of student-generated learning materials
- Examples of student generated content and enhancements
 - “BlueVue” a platform for student generated video and feedback.
 - Web-enhanced interactive study guides using SoftChalk
 - BuckiPedia – a collaborative platform for student learning
 - Student enhancements of recorded lectures
- Examples from the audience
- Discussion of best practices for facilitating student-generated learning materials.

Agenda

- The Problem
 - Students emailing study materials clogging in boxes and servers
- Social Networking guiding principles
- Solution – Tutor.net
- Results
- Other Benefits
- The “Trench”

Groundswell

- The groundswell is a social trend in which people use technology to get the things they need from each other, rather than form traditional institutions like corporations.

Li, C. Bernoff, J. Groundswell winning in a world transformed by social technology, 2008 Harvard Press

The Social Technographics Profile

groundswell: winning in a world transformed by social technologies
Li and Bernoff

	US
Creator	18%
Critic	25%
Collector	12%
Joiner	25%
Spectator	48%
Inactive	44%

Making Sense of Student-Generated Co-Curricular Materials SoftChalk

Chari Larsen
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Project Rationale

- The objective of this project was to create supplemental study aids for the M1 classes.
- Two issues needed to be resolved before the project could start.
 - Program to use: needed to be easy to use and support
 - People to run the project: needed to know the material and have time to do create the lectures



SoftChalk

- Program to create web-based lessons
- No HTML or programming skills required. Basic Microsoft Office skills are all that is needed.
- Several interactive activities
 - Crosswords
 - Flash Cards
 - Matching
 - Drag-n-Drop
 - Image Labeling
 - Quiz Questions
 - Pop-up Text Annotations
- <http://www.softchalk.com/>



FINISHED PRODUCT

Anatomy

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Superficial Muscles of the Back

On this Page
Superficial Muscles of the Back
Trapezius

- Origin = the tendinous attachment of a muscle to the bone that remains fixed when the muscle contracts. In most cases, the origin is medial to the insertion.
- Insertion = the tendinous attachment of a muscle to the bone on which the muscle operates (i.e., the bone moves when the muscle contracts).
- Adduct = movement toward the center line of the body.
- Abduct = movement away from the center line of the body. (Think of kidnapping as child abduction, the child is being taken away from the parents, therefore abducting is taking away from something, in the case of movement, abducting is taking away from the midline).
- Extension = movement of a limb to increase the angle of the joint, the movement by which the two ends of any jointed part are drawn away from each other.
- Flexion = the act of bending or the condition of being bent; movement of a limb to decrease the angle of a joint.
- Medial = located in or directed toward the midline, closer to the body's midline
- Lateral = Situated or extending away from the median plane of the body

Trapezius

Host Defense

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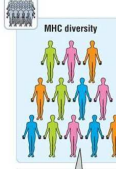
Antigens & Antibody Structure

- Adaptive immunity is mediated by lymphocytes. B and T cells are types of lymphocytes.
- Antigen receptors is mediated by immunoglobulins (Ig). T cell receptors (TCR) are major histocompatibility complex (MHC).
- Ig recognizes whole antigen while TCRs recognize degraded proteins (peptides) bound to MHC.
- Ig, TCR, and MHC molecules are all "built" from a common structural unit.

The diagram illustrates the structural relationship between these molecules. It shows an 'Immunoglobulin domain "building block"' on the left, which connects to 'MHC' and 'TCR' in the center. Both 'MHC' and 'TCR' are connected to 'Ig' (immunoglobulin) on the right. Finally, 'Ig' is connected to 'Antigen recognition' on the far right. Red arrows indicate the flow of information or structural linkage from the building block through the receptors to the final recognition step.

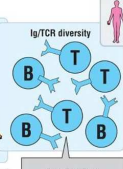
Structural Diversity

- MHC Genes - are polymorphic, **highly** and **co-dominant**
 - The MHC structure encodes for multiple genes encode for different peptides on the MHC. **As many different peptides as possible** can be processed by MHC because **polymorphism** (polymorphic) are expressed. Remember, if there are no peptides presented, there will be no T cell activity.
- Ig & TCR Genes - assembled by somatic DNA rearrangement (VDJ recombination), are polygenic, polymorphic, and not co-dominant
 - There are too many possible antigens for the body to have specific recognition molecule genes. Somatic recombination helps to provide the ability to have enough specific receptors for all the antigens. A lymphocyte should express antigen receptors with a single antigenic specificity to avoid targeting multiple antigens after being stimulated by a single antigen.



MHC diversity

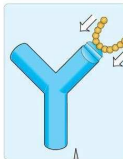
MHC is polymorphic and polymorphic; each individual



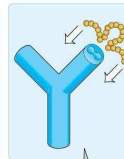
Ig/TCR diversity

Every B or T cell expresses a different antigen-recognition

- Linear (continuous) Epitope: contiguous sequences (like residues 45-52 in a polypeptide chain) recognized by an antibody. Are still recognized if the protein has been denatured.
- Conformational (discontinuous) Epitope: a three dimensional structure recognized by an antibody. Antibodies don't recognize conformational epitopes if the protein has been denatured.



Linear epitope
Amino acid residues are adjacent in the polypeptide chain



Discontinuous epitope
Created from amino acid residues located in different parts of the polypeptide chain

© Pearson, Ben & Kate. Immunology for Health Professionals, 2e. www.pearsoned.com

Quiz Me

Quiz Me

Value: 1

All antigens are immunogens.

True

False

Sorry, incorrect answer.

Points scored this time: 0

Quiz Me

Value: 1

All immunogens are antigens.

True

False

Right! Good job!

Points scored this time: 1

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[print all](#)

Activities

Labeling Activity

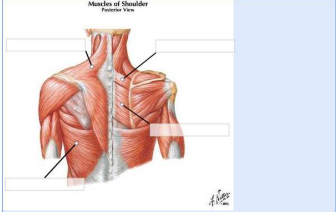
Sorting Activity

Crossword Activity

Labeling Activity

Close

Drag the labels from the bottom to the correct slots.



Trapezius

Latsissimus dorsi

Rhomboid major

Rhomboid minor

Value: 0

Sorting Activity

Close

Click the card deck to view a card. Drag the card from the bottom to the correct category.

IgM

IgG

four subclasses

IgA

muscular immunity

IgE

IgD

18 cards left

Value: 0 Score: 0

Drag-N-Drop Activity

Crossword Puzzle

Student Access

- BlueLine (Angel) –
 - Secured access for all students and professors
 - Easy to upload and make corrections
 - Can be accessed off campus

Use Statistics

- Anatomy –
 - 125 (99%) students used it
 - 57 Lectures
 - Total of 11,446 hits
 - Average of 200 hits per lecture
 - Average of 92 hits per student (ranged from 1-374)

Use Statistics

- Molecular & Cell Biology –
 - 126 (100%) students used it
 - 49 Lectures
 - Total of 11,358 hits
 - Average of 232 hits per lecture
 - Average of 90 hits per student (ranged from 1-358)

Use Statistics

- Host Defense –
 - 102 (81%) students used it
 - 31 Lectures
 - Total of 2,587 hits
 - Average of 83 hits per lecture
 - Average of 25 hits per student (ranged from 1-152)

Student Opinions

- "I found them to be extremely helpful, particularly for anatomy."
- "...they were the perfect back-up when I had missed something in class and also gave me a chance to practice my information with the 'games' at the end."
- "I really found the study guides helpful, especially for lectures where professors made the material seem confusing."
- "Some were obviously better than others."
- "I found them very, very helpful."

Advantages & Disadvantages

- Condensed format of lectures.
- Not graded so students feel free to use it.
- Easy to update.
- Provides interactive learning.
- Reinforces classroom learning.
- Provides immediate feedback to gauge understanding.
- Lectures always changing.
- Regularly will need to be updated with the changing curriculum.
- Mistakes can be made.

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Future Directions

- Complete the M1 year
 - Microbiology
 - Behavioral Medicine I
 - Neuroscience
- M2 year – possibly a 4th year elective for those interested in academic medicine.

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Buckipedia

TutorNet
Larry Hurtubise
The Ohio State University
College of Medicine



Planning to use Social Networking

groundswell: winning in a world transformed by social technologies
Li and Bernoff

- **P** People: "What is the Social Technographic Profile of your constituency?"
- **O** Objectives: "What are your Goals?"
- **S** Strategies: "how do you want communications to change"
- **T** Technology: After determining your people, objectives, and goals, choose your technology

Solution

- Used University LMS "Carmen" (from Desire2Learn)
- Developed a course
- Loaded all M1-M4
- Called discussions BuckiPedia
 - Students uploaded materials, descriptions
 - Posts are searchable

2007-2008 Posts

Forum and Topic Statistics

Forum/Topic Title	Number of Messages				Average Rating
	Total	Pinned	Unapproved	Scored	
# Integrated Pathway	287	0	0	0	★★★★★
# Independent Study Program	360	0	0	0	★★★★★
# Med 3-4	9	0	0	0	★★★★★
# USMLE	1	0	0	0	★★★★★
Step 1	1	0	0	0	★★★★★
Step 2 CK	0	0	0	0	★★★★★
Step 2 CS	0	0	0	0	★★★★★

2008-2009 Posts

Forum and Topic Statistics

Forum/Topic Title	Number of Messages				Average Rating
	Total	Pinned	Unapproved	Scored	
# Guidance from Med Students	21	0	0	0	★★★★★
# Integrated Pathway	157	0	0	0	★★★★★
# Med 2 ISP	17	0	0	0	★★★★★
# Med 3-4	6	0	0	0	★★★★★
# USMLE	0	0	0	0	★★★★★
# Med 1 ISP	11	0	0	0	★★★★★
# Med Path	5	0	0	0	★★★★★

Added features

- NetiQuette
- Disclaimer
- Electoins

Subsequent development

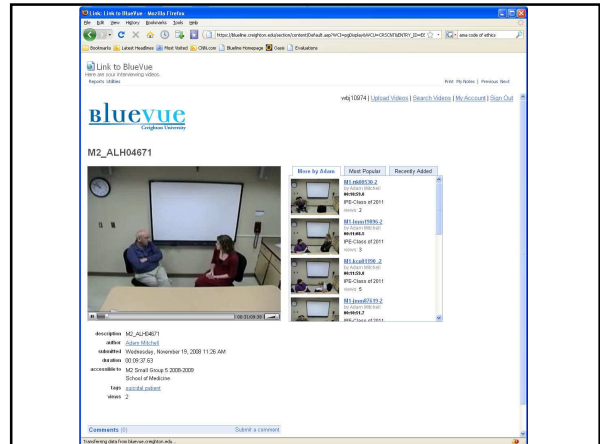
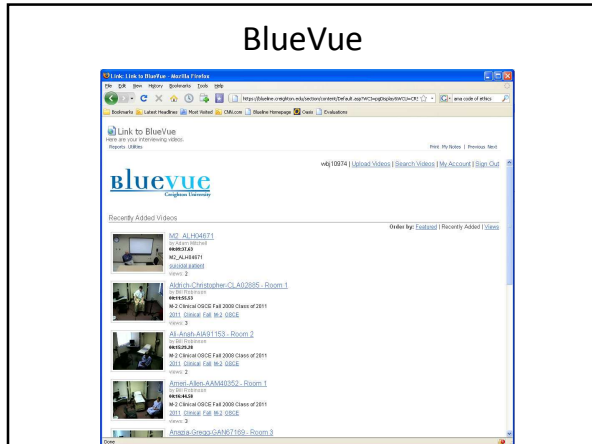
- Calendar
- Quiz Bank
- News
- Growth in number of all Student sites
 - Research opportunities
 - Financial services
 - Advising
 - Students asked to add student help sections

What would a tale be with out a trench

- LMS are not SNs
- Rosters are manual
- Added a file size upload limit
- Need more coordination
- University Schedule is not our schedule


BlueVue

- Youtube-like interface for uploading videos
- Curricular use: render low-res flash videos of patient interviews
 - Comment section
 - Selective permissions
 - Archived for all four years
- Proposed co-curricular use: produce and upload edutainment videos



Results/Future

- Students have not adopted BlueVue as a social networking medium.
- Additional guidance may encourage students to consider this medium for co-curricular uses
- Appoint “student champions”
- Post materials from other institutions




Discussion Questions

- What are examples of student-generated content from students at your institution?
- What motivates students to create these products?
- What are student preferences with respect to content and technology to help their learning?
- What are the ways that institutions can support the development of student work while safeguarding accuracy as well as the intellectual and legal rights of faculty and original authors?
- Do these products actually facilitate learning?

Audience Identified Resources

Student-Generated Review Charts

Created by Amanda Forystek, M2



Pathology/Diseases

MOI	Metab/Organ	Virulence	GRAM POSITIVE BACTERIA		
			Diagnosis	Treatment	
ANTIBIOTICS: Natural and Semi-Synthetic Penicillins: Bactericidal					
<i>Corynebacterium diphtheriae</i>	Classical characteristic of gram stain, no spore formation Growth: potassium tellurite, Loeffler's medium 2-4 day incubation	Adhesion, exfoliating toxin (phage, mediates EF2 by ADP-ribosylation) Forming pseudo-membrane pharynx where it secretes its toxin	Diphtheria (respiratory) Pharyngitis or tonsillitis + fever Pseudomembrane formation Necrotic diphtheria Gulland-Barre Hemolytic Diphtheria (toxemia) Chronic nose-bleeding ulcers resistant to many antibiotics	Antitoxin (AMP (antitoxin product)) Erythromycin or penicillin Vaccine: DPT, TD booster every 10 years For adults inactivated brand Shiga toxin : direct fluorescent antibody	Severe impairment of gas exchange with severe hypoxia
<i>Listeria monocytogenes</i>	Beta-hemolytic No spore Catalase + Mobile: 25°C Grow: 2-5°C Facultative intracellular parasite	Intervallin: mediates adhesion by interaction with listeriolysin O allows escape from vacuole and to be thought of as only CMV with endotoxin (EPS) but you see these if not empty	Menococci is sensitive Affects also meningitis Gram-negative Infectiogenic : transplacental infection with abscess	Ampicillin + gentamicin TMP/SMX after nativity Tx for meningitis may require 3-6 weeks	Moves from cell to cell w/o leaving the vacuole Involuntary cell-mediated, only cytokine activated macrophages
<i>Staphylococcus aureus</i>	Spore forming Rashes: opportunistic due to endospores and medical hardware Lauz phageid at 42+ degrees	Protein capsule (virulence) Exfoliatin Proteinase Ag (PA) Elastinase (EF) Lactal factor (LF)	Antifase : Catalase: forms hydrogen peroxide (2-5 d) Elastinase (elastinase): spores transported to hilar Lipase: splits with massive effect of diffusion and medullary widening , death in 2-3 hrs Abx: very, most deadly Food poisoning	Ciprofloxacin or doxycycline for 60-100 days to kill spores IV for first few weeks, then PO	Severe: including spores from animal host, abscess, contaminated meat, terrerites
<i>E. coli</i>	Spore forming	Enterotoxins: heat labile and stable	Food poisoning Enteric : 1-6 hrs food rise Shiga toxin contaminated meat		It is not used to treat because cause by enterotoxin

Pathology/Diseases

Pulmonary Disorders				
Restrictive Lung Disease				
Decreases compliance (lungs are stiff) PFT: Decrease in RV, TLC, FRC, decrease in FEV1 and FVC → increase in FEV1/FVC, flow volume curve is shifted to right				
Disease	Causes	Pathologic Findings	Clinical Findings	Diagnosis/Treatment
Acute Respiratory Distress Syndrome (ARDS)	Shock, sepsis, trauma, uremia, gastric aspiration, acute pancreatitis Drugs: oxygen toxicity, bleomycin, heroin	Diffuse alveolar damage : with increases in alveolar capillary permeability (due to vasodilation, contraction of endothelial cells) leading to leakage of protein rich fluid into the alveoli and formation of hyaline membranes	Severe impairment of gas exchange with severe hypoxia	
Infant Respiratory Distress Syndrome (IRDS)	Most common cause of death in premature infants Cause is a decrease in surfactant	Hyaline membrane formation	Dyspnea, cyanosis, and tachypnea shortly after birth	Lecithin-sphingomyelin ratio is less than 2:1 shortly before birth
Sarcoidosis	Common in African lineages, especially in teen-youth adults Unknown etiology: diagnosis of exclusion CD4+ helper T's	Noncaseating granulomas involving multiple organ systems Schaumann bodies : asteroid bodies in giant cells	Interstitial lung disease, enlarged hilar lymph nodes, anterior uveitis, erythema nodosum of the skin Hypocalcemia	Patients will have anergy to skin test antigens Tx: corticosteroids Check for TB- don't want to give steroids in this case
Idiopathic Pulmonary Fibrosis		Chronic inflammation and fibrosis of the interstitial space between the alveolar walls and the capillaries Acute : related to exposure (Chills, fever, cough, malaise, weight loss) Chronic : progressive massive fibrosis Common : <i>Isaoyanates</i> <i>Micropopora faeni</i> <i>Thermophilic actinomycetes vulgaris</i>	Alveolitis → fibrosis → cystic distortion Honeycomb lung	5 yrs → death often
Hypersensitivity Pneumonitis	Type IV hypersensitivity (granuloma) with Th1 response to thermophilic fungi, avian proteins, or organic dusts Also Type III reaction (cytolines) → does not cause disease, though AKA Extrinsic allergic alveolitis			Avoid Ag Oral steroids (prednisone) if acute, bronchodilators

Medications

Drug Name	MOA	Pharm Profile	Uses	Side Effects
Penicillin G Penicillin V	Competitive inhibition of transpeptidase enzyme (penicillin binding proteins) → inhibits cell wall synthesis	Proxaline and benzathine pen G are IM, IV Penicillin V is oral Amoxicillin-PO	Strep, Staph, Clostridia N. meningitidis Syphilis	Serum sickness: Ag/Ab complex causing hemolytic anemia
Aminopenicillins Ampicillin Amoxicillin		IV	Broader GM- coverage HELPS kill enterococcus (Staph, E. coli, Listeria, Proteus, Salmonella and Enterococcus)	Maculopapular rash in patients with mono, CLL, or taking Allopurinol Pseudomembranous colitis
Penicillinase-R penicillins Nafcillin Oxacillin (IV/PO) Methicillin			S. aureus (except MRSA) Nafcillin-severe (IV 4 hrs) Dicloxacillin-mild	Interstitial nephritis (methicillin), not used Increases liver enzymes
Carboxyl/ureidopenicillins Ticarcillin Carbenicillin Piperacillin			Extended GM- rod coverage, Pseudomonas and anaerobes (B. fragilis)	TCP takes care of pseudomonas and B. fragilis Lower dose in kidney failure
β-Lactamase inhibitors Clavulanic acid Tazobactam	Clavulanic acid + amoxicillin = augmentin Clavulanic acid + ticarcillin = ticamintin Tazobactam + piperacillin = Zosyn Ampicillin + sulbactam = Unasyn		Coverage against β-lactamase producing species (aureus, influenza, fragilis)	

Physiology

"Pacemaker Type" (SA and AV node) **Action Potential**: These cells lack the fast-opening Na channels and the K channels. However, they have channels that conduct the hyperpolarization activated "funny" current (i_f), a depolarizing current that increases as the cell repolarizes (open around -50 to -60 mV and slowly lets Na into the cell). This "funny" current leads to the spontaneous depolarization of the cells. They also have a second type of Ca channel, the T-type channel, which opens at slightly more negative threshold than the L-type, but inactivates more rapidly. Cells in the AV and SA nodes don't have resting potentials and don't rely on other cells to depolarize.

AV Node Properties: all of the properties listed below can be adjusted by the autonomic nervous system

- Slow conduction – has a slow rate of depolarization, paucity of gap junction between cells, and a small cell diameter which results in the slow conduction of the impulse through the node. Parasympathetic activation slows the rate of impulse conduction through the AV node, while sympathetic activation speeds it up.
- Low-pass filter – high atrial rates do not lead to high ventricular rates because some of the impulses do not make it through the low-pass filter of the AV node. Parasympathetic activation makes the AV node a better filter. Sympathetic activation allows the higher rate set by the SA node to pass through the AV node without being blocked.
- Reserve pacemaker – the AV node acts as a reserve pacemaker because its cells can spontaneously depolarize and reach threshold in the absence of a signal from the SA node. At the same time that parasympathetic activation slows the SA pacemaker, it prevents the AV node from taking over the pace-making. Sympathetic activation makes the AV node more likely to take over as pacemaker.

Parasympathetic Nervous System:

- Innervates the SA and AV nodes through the vagus nerve. Ach is released.
- Generally it slows the rate of spontaneous depolarization of the pacemakers and slows down the rate at which action potentials move through the AV node. These effects are mediated through G proteins linked to the M2 receptors.
- Hyperpolarization – Ach opens the K_{ACH} channel which drives the maximum diastolic potential farther away from the threshold of the L-type Ca channels. As a result the pacemaker takes longer to reach threshold.
- Slower Spontaneous Depolarization – Ach slows the opening of hyperpolarization-activated Na channels of the pacemaker (i_h) current, thereby reducing the inward flow of Na ions. Moreover, the additional outward K current, by opposing the inward depolarizing pacemaker current (i_f), slows the rate of spontaneous depolarization of the pacemaker cells.
- Slower Upstroke of the Action Potential: Ach also reduces the influx of Ca ions through the L-type Ca channels by reducing the production of the second messenger cAMP.

Physiology
Action Potential Phases

	Channels	mV changes	Time	Misc.
Initiation	Ions enter the cell through gap junctions from neighboring cells	Slightly depolarizes the cell (from -85 or -70mV)		
Phase 0 – Depolarization	Na channels open when membrane is depolarized to -70mV. L-type Ca channels begin to open when depolarizes to -35mV.	From -70 to +20mV -Almost vertical slope	Short <50ms	Phase ends as Na channels inactivate
Phase 1 – Early Repolarization & Phase 2 – Plateau	Na channels are inactivated K _r & K _s are closing L-type Ca channels are opening Depolarization-opened K channels (K _r & K _s) opening	From around +20mV to -15 mV	About 400ms	Balance of K out and Ca in causes the plateau -Ca channels inactivate at the end of phase 2 -myoplasmic [Ca] is highest at end of plateau Muscle tension is peaks slightly after [Ca] peak
Phase 3 – Repolarization	L-type Ca channels are inactivated K _r & K _s are open As the membrane repolarizes the K channels above close but K _r opens	From around +15mV to resting potential (-85 mV)	About 100ms	Outward movement of K repolarizes the membrane
Phase 4 – Resting	K _r is the dominant channel Na and L-type Ca channels change from inactivated to closed	Very little change in mV	Until another action potential	Includes relative refractory period
Refractory Period	When the Na and L-type Ca channels are inactivated allows ensures the muscle to contract (is required for cardiac muscle cells)		Includes phases 1-3	Relative refractory period – time from -70mV (where some Ca channels go to closed) to when all channels are closed.