

An Effective Teaching Strategies to Improve Student's Academic Performance

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Edmonton AB,
CANADA**

Background

- Teaching is an **art** & we are **performers**.
- Passion for teaching is different than effectively transferring knowledge from professor to students.
- Gone are the days of didactic, passive teaching!
- Modern students are demanding and appreciate various teaching modalities.



Background

- The current/modern educational curriculum worldwide consists of,
 - **Student-centered**, content-driven & **evidence-based** active learning.
- A blended/hybrid learning approach that is aimed to.
 - Foster student engagement
 - Improve the subject knowledge
 - More professor-student interaction
 - Social & communication skills & critical thinking
 - Retain a long-term knowledge of the course



Objectives



- Factors impacting teaching and learning of the courses
- To evaluate active learning strategies
- To assess the impact of these strategies on class performance & a long-term knowledge retention

Factors That Impact Teaching & Learning



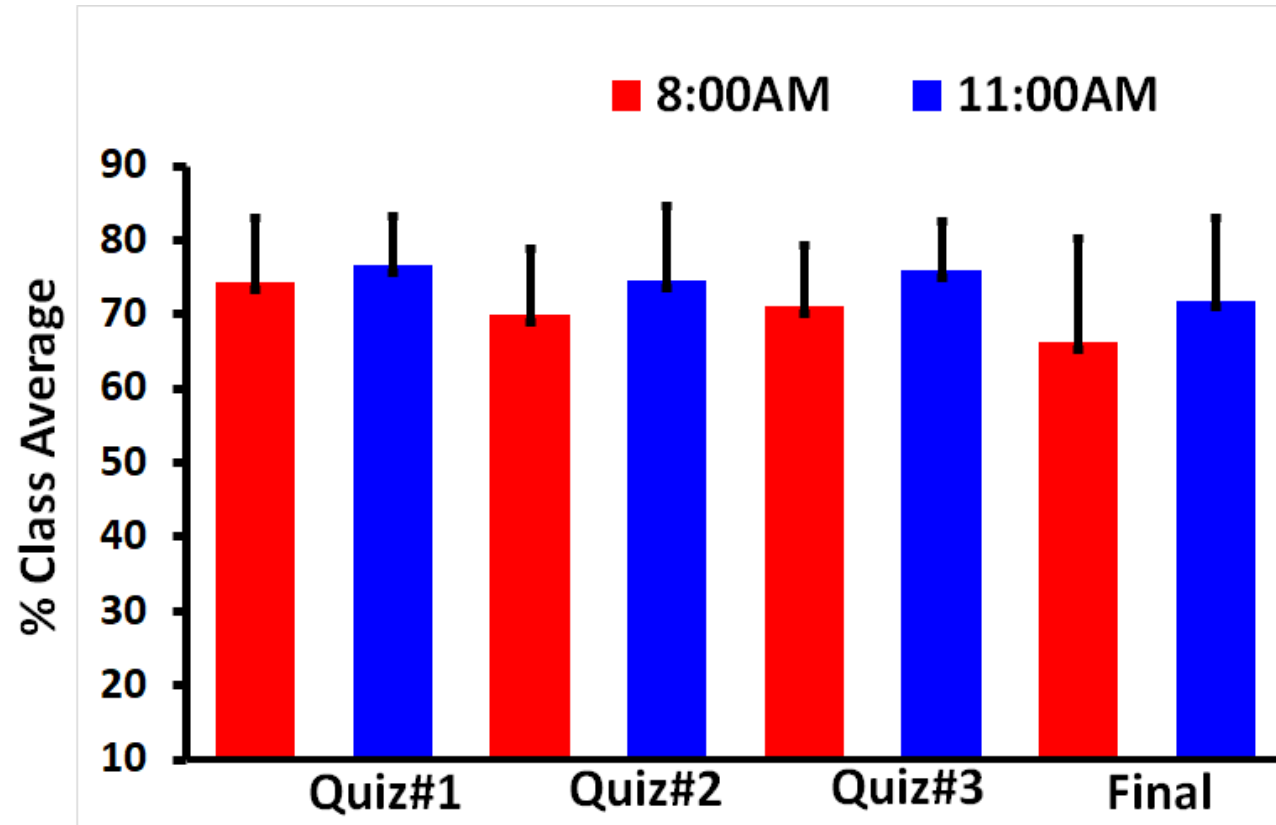
Student-Related Factors Impacting Teaching & Learning of the Course

- Inadequate time to study the courses
- Class time, attendance & the level of textbook use
- Lab experience
- English as a second language
- Prior academic achievement in sciences
- Own confidence in science knowledge
- Additional factors,
 - Prioritization
 - Self-efficacy
 - Study time & skills



Class time

*Factors
Impacting
Teaching and
Learning*



Faculty-Related Factors Impacting Teaching & Learning of the Course

- Course organization & methods of delivery
- Experience in didactic, passive teaching
- Available curriculum time
- Teaching style & strategies
- Own confidence & knowledge level



Course Assessment



- How do you evaluate understanding & knowledge in your course?



Pre-Teaching Assessment





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Navigation: My Blackboard, **Courses**, Content Collection

Course Content

Course Content

Build Content ▾ Assessments ▾ Tools ▾ Partner Content ▾ Discover Content ↑↓

Chapter-1 folder

Chapter-3 (Tissues) folder ▾

Course outlines-Winter-2020

WileyPlus FIRST DAY OF CLASS!

Left sidebar:

- HLSC-120-Human Anatomy
- Course Dashboard
- Course Content
- My Grades
- Student Resources
- Faculty - Blackboard Help
- Copyright Notice
- Faculty - START HERE
- Announcements**
- Email
- Discussions
- Tools
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Course Outline Winter 2020

HLSC 120 – Sections BN03 & BN04 – Human Anatomy

CALENDAR DESCRIPTION:

This is an introductory course in human anatomy for the health sciences. It provides students the opportunity to gain anatomical knowledge of human tissues, organs, and major organ systems in terms of its structures, the related anatomical terminology and how these structures relate to function.

Note: Students cannot obtain credit in both HLSC 120 and NURS 105.

Course Credits: 3

Pre-requisites: Biology 30

Co-requisites: None

Course Hours: Theory: 45 Laboratory: 0 Clinical: 0

COURSE INSTRUCTOR:

Raj Narnaware, BSc, MSc, PhD
Office: 9-504D
Phone: (780) 497-5585
E-mail: narnawarey@macewan.ca

Office Hours: Wednesday & Friday: 1:00 PM – 2:30 PM, and by appointment.

Blackboard: Will be used for course-related information, announcements, readings and preparation.

Note: E-mails need to be sent through the mymacewan portal; e-mails from other sources will be regarded as spams and may not be replied back in time to address the matter at hand.

LEARNING OUTCOMES:

Outcome:	Upon successful completion of this course, the student will be able to:
1	Discuss the structural and regional organization of the human body.
2	Describe the systems of the body to the tissue level.

Class Schedule

HLSC 120 CO - BN03BN04 - RN - WI 20 (R) - Word

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Class	Date	Description
1	Jan. 08 2020	Ch. 1 – Introduction
2	Jan. 10 2020	Ch. 3 – Tissues
3	Jan. 15 2020	Ch. 5 – Integumentary System Ch. 6 – Bone Tissue
4	Jan. 17 2020	Ch. 9 – Joint (articulations)
5	Jan. 22 2020	Ch. 10 – Muscle Tissue
6	Jan. 24 2020	Ch. 8: Appendicular skeleton- Pectoral Girdle – Bones and Muscles
7	Jan. 29 2020	Ch. 8: Appendicular skeleton - Upper Limb and Hand – Bones and Muscles
8	Jan. 31, 2020	Ch. 8: Appendicular skeleton- Upper Limb and Hand – Nerves and Blood Circulation
9	Feb. 05, 2020	Ch. 13 – The Heart
10	Feb. 07, 2020	MID-TERM #1
11	Feb. 12, 2020	Ch. 14 – Blood vessels & Fetal Circulation Nerves Ch. 15 – Lymphatic System
12	Feb. 14, 2020	Ch. 7: Axial Skeleton – Skull -Bones, Muscles
13	Feb. 18-21, 2020	READING WEEK/TERM BREAK – NO CLASSES
14	Feb. 26, 2020	Ch. 7: Axial Skeleton – Vertebral Column & Rib Cage Bones, Muscles and Blood Circulation
15	Feb. 28, 2020	Ch. 23 – Respiration
16	Mar. 04, 2020	Ch. 16 – Nervous Tissue Ch. 17 – Spinal Cord and Spinal Nerves
17	Mar. 06, 2020	MID-TERM #2
18	Mar. 11 2020	Ch. 18 – The Brain and Cranial
19	Mar. 13, 2020	Ch. 19 – ANS (Basic anatomy)
20	Mar. 18, 2020	Ch. 21 – Special Senses
21	Mar. 20 2020	Ch. 8: Appendicular skeleton- Pelvic girdle – Bones, Muscles

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Power point presentation [Compatibility Mode] - PowerPoint

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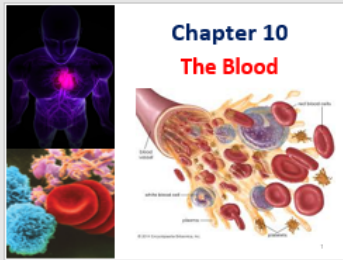
Slide 8 of 55

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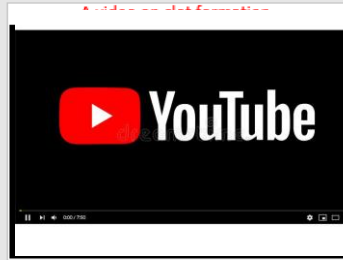
Chapter 10

The Blood



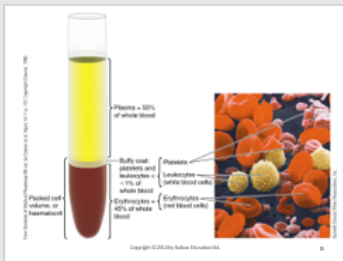
Contents

- Introduction
- Plasma
- Erythrocytes
- Leukocytes
- Platelets and Haemostasis



Introduction

- The blood represents about 8% of total body weight.
- Average volume (CO),
 - 5 liters in women
 - 5.5 liters in men
- Consists of three types of cellular elements in the plasma
 - Erythrocytes** (Red blood cells)
 - Important in O₂ & CO₂ transport to body tissue
 - Leukocytes** (White blood cells)
 - Immune system's mobile defense units, i.e., antibodies
 - Platelets** (Thrombocytes)
 - Important in hemostasis (blood clotting)



Plasma = 55% of whole blood

Packed cell volume, or hematocrit

Buffy coat: platelets and leukocytes = 1% of whole blood

Plasma

Erythrocytes = 45% of whole blood

Leukocytes = 1% of whole blood

Platelets = 0.1% of whole blood

Constituent	Functions
Plasma	Transport O ₂ and CO ₂ , primarily O ₂
Erythrocytes	Phagocytes that engulf bacteria and debris
Leukocytes	Attack parasite worms; important in allergic reactions
Neutrophils	Release histamine, which is important in allergic reactions, and heparin, which helps clear fat from the blood
Monocytes	Can expand to become tissue macrophages
Lymphocytes	Produce antibodies
B lymphocytes	Cell-mediated immune responses
Platelets	Hemostasis

Hematocrit

- 99% of cells in a centrifuged test tube is composed of RBCs. It is hematocrit/packed cell volume.

I. Hematocrit values

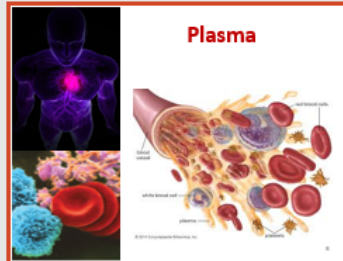
Gender	Value
Women	42%
Men	45%

II. Average pl. Volume in blood

Gender	Value
Women	58%
Men	55%

- WBC and platelets are colorless & less dense
- These cells represent less than 1% of the total blood volume

Plasma



Plasma and its proteins

- Plasma is composed of 90% water.
- Plasma proteins compose 6-8 % of plasma's total weight.
- Three plasma proteins.

Plasma and its proteins


Globulins

- Exists in three forms (α , β & γ)
- These units bind & transport many substances such as TH,

TABLE 1 • Blood Constituents and Their Functions

Constituent	Functions
Plasma	Transport medium; carries heat
Water	Medium for chemical reactions
Electrolytes	Maintain osmotic balance; conduct electricity

I. Erythrocytes



Chapter-10: The Blood

In-Class Activity Questions

Q1. Why does a person suffering polycythaemia observe a high blood pressure?

Q2. Why do the hematocrit value increase during dehydration?

Q3. Detail the life cycle of an erythrocyte, including the control of erythrocyte production.

Q4. What are the different types and functions of plasma proteins?

Q5. What are the different kinds of white blood cells and how are they produced?

Sample Practice Questions

MCQs, True/False & Fill-in-the-blanks

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MULTIPLE CHOICE

1. About how many litres of blood are in the human body?

- a. 2
- b. 5
- c. 10
- d. 12

ANS: ☐

2. The buffy coat, which represents < 1 percent of the whole blood, comprises

- a. erythrocytes and platelets.
- b. leukocytes and platelets.
- c. leukocytes and clotting factors.
- d. platelets and clotting factors.

ANS: ☐

TRUE/FALSE

3. If the haematocrit is 47, this means that 47 percent of the whole blood consists of plasma.

ANS: ☐

4. The plasma is about 50 percent water.

ANS: ☐

FILL-IN-THE-BLANKS

5. The hormone erythropoietin is produced by the _____.

ANS:

6. _____ prevents platelets from aggregation.

Page 1 of 2 103 words

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Matching Questions

(Q12) Column A

1)spermatogenesis

2)regeneration

3)parthenogenesis

4)oogenesis

5)insemination

Column B

**a)sperm
injection**

**b)formation of
ovum**

**c)formation of
sperm**

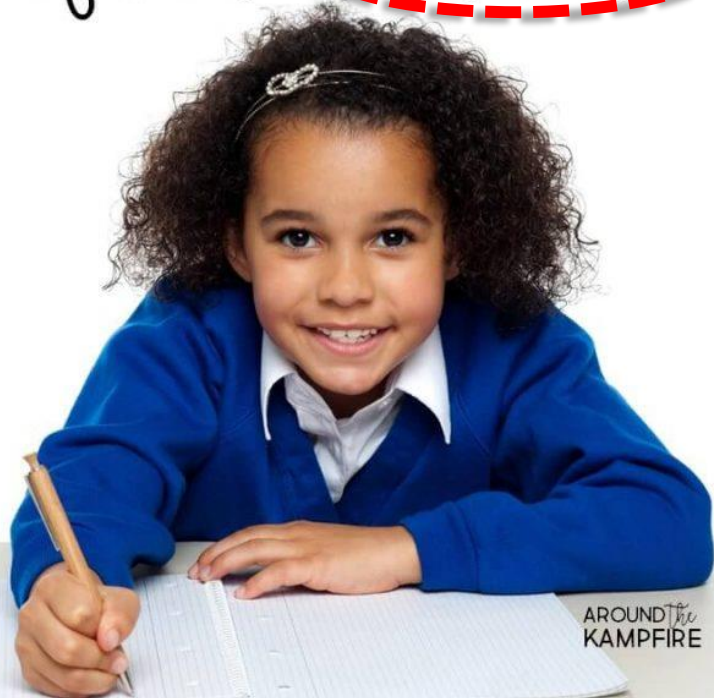
**d)repair of
damage tissues**

**e)development
of unfertilized
ovum**

Getting your class

**BACK ON
TRACK**

after a break



AROUND
the
KAMPFIRE

A Mini Break & Humour in Classroom!



- On-line Kahoot quiz
- In-class quiz
- Student feedback & reflection
- Review quizzes & mid-terms in class



Kahoot Time

Which of the animals below is a mammal?



Full Screen

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Skip

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Answers



Robin



Gorilla



Shark



Snake

In-class quiz

1. What is the most abundant type of cellular element in the blood?
 - a. Erythrocytes
 - b. Neutrophils
 - c. Leukocytes
 - d. Lymphocytes
2. Which plasma globulins are the antibodies?
 - a. Alpha
 - b. Beta
 - c. Gamma
 - d. Delta
3. What is the percentage of the average blood volume occupied by plasma in men?
 - a. 42%
 - b. 45%
 - c. 55%
 - d. 58%
4. Why is it important that biconcavity of the erythrocyte on the cell decreases its flexibility?
 - a. It prevents osmolarity changes.
 - b. It increases the rate of gas exchange across the membrane.
 - c. It provides an additional area for endocytosis.
 - d. It encourages cellular respiration.

Class Evaluation

Teaching/Class Evaluation

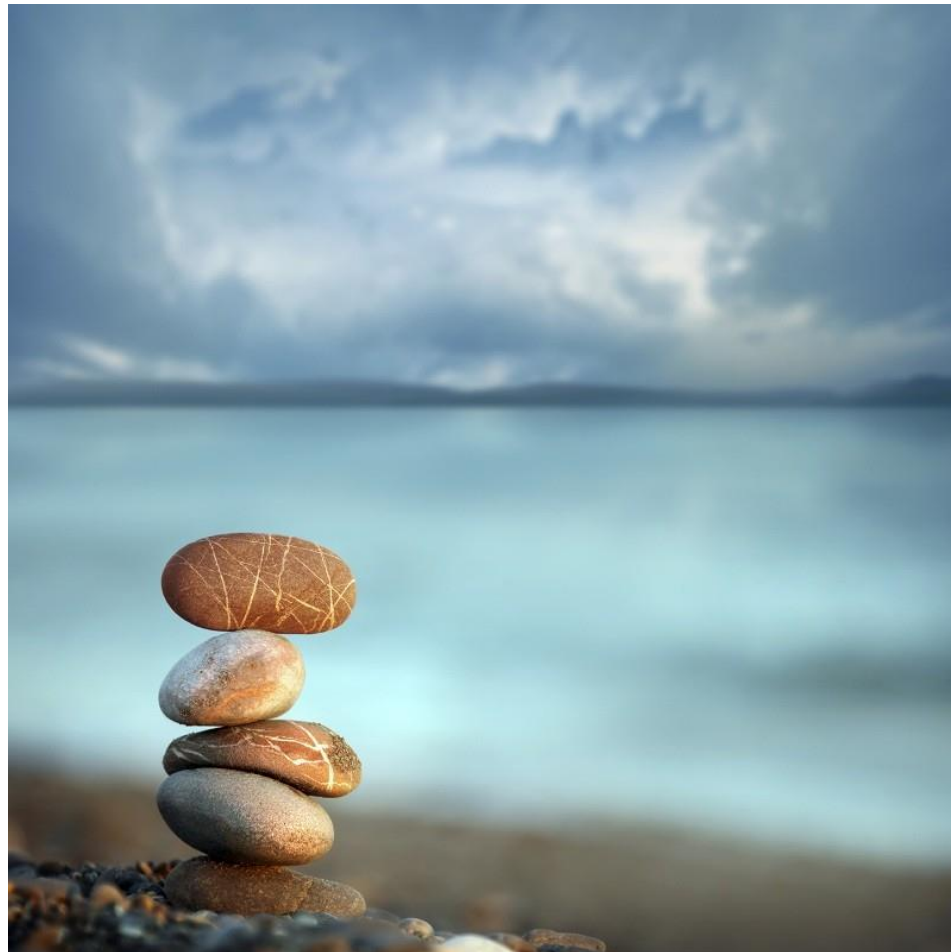
1. What are the three (3) important things/aspects you have learned from the Blood chapter?
 1. How clots are formed
 2. Different types of Anemia & their causes.
 3. Role of RBC's.
2. In what different way Raj should have taught this chapter?

Slower + provided us w/ more explanation on the details.
3. Did you find practice questions posted on Blackboard useful (circle your answer)?

☒ A. Yes B. No
4. Did you find in-class quizzes useful to test your knowledge of a chapter?

☒ A. Yes B. No

Impact of Various Teaching Strategies on Class Average & GPA in Nursing Students



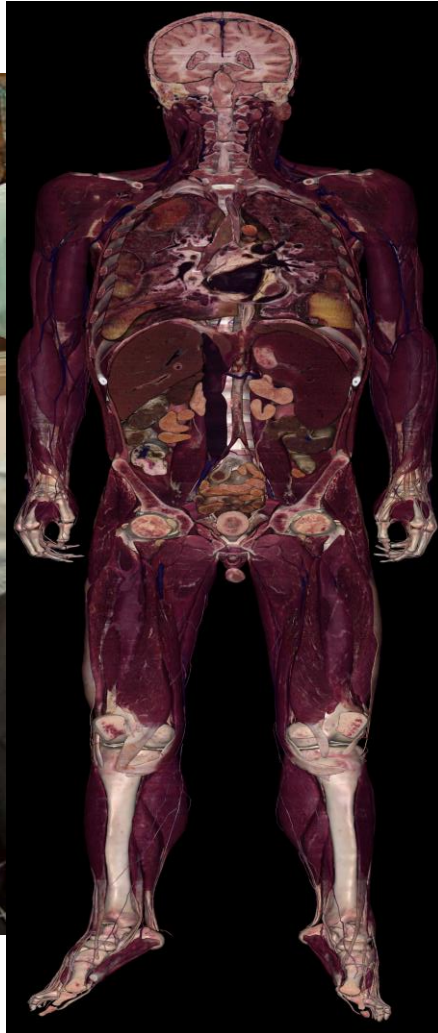
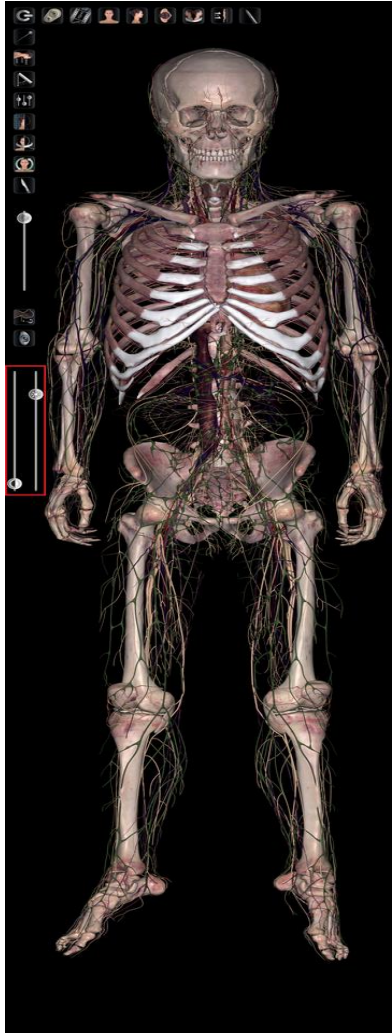
Active Learning Strategies in Present Study



- Teaching Technology: Human Virtual Human Cadaver-Anatomage
- Inclusion of the Anatomical Images in Anatomy exams
- On-line and In-class Activities (Content Reinforcement)

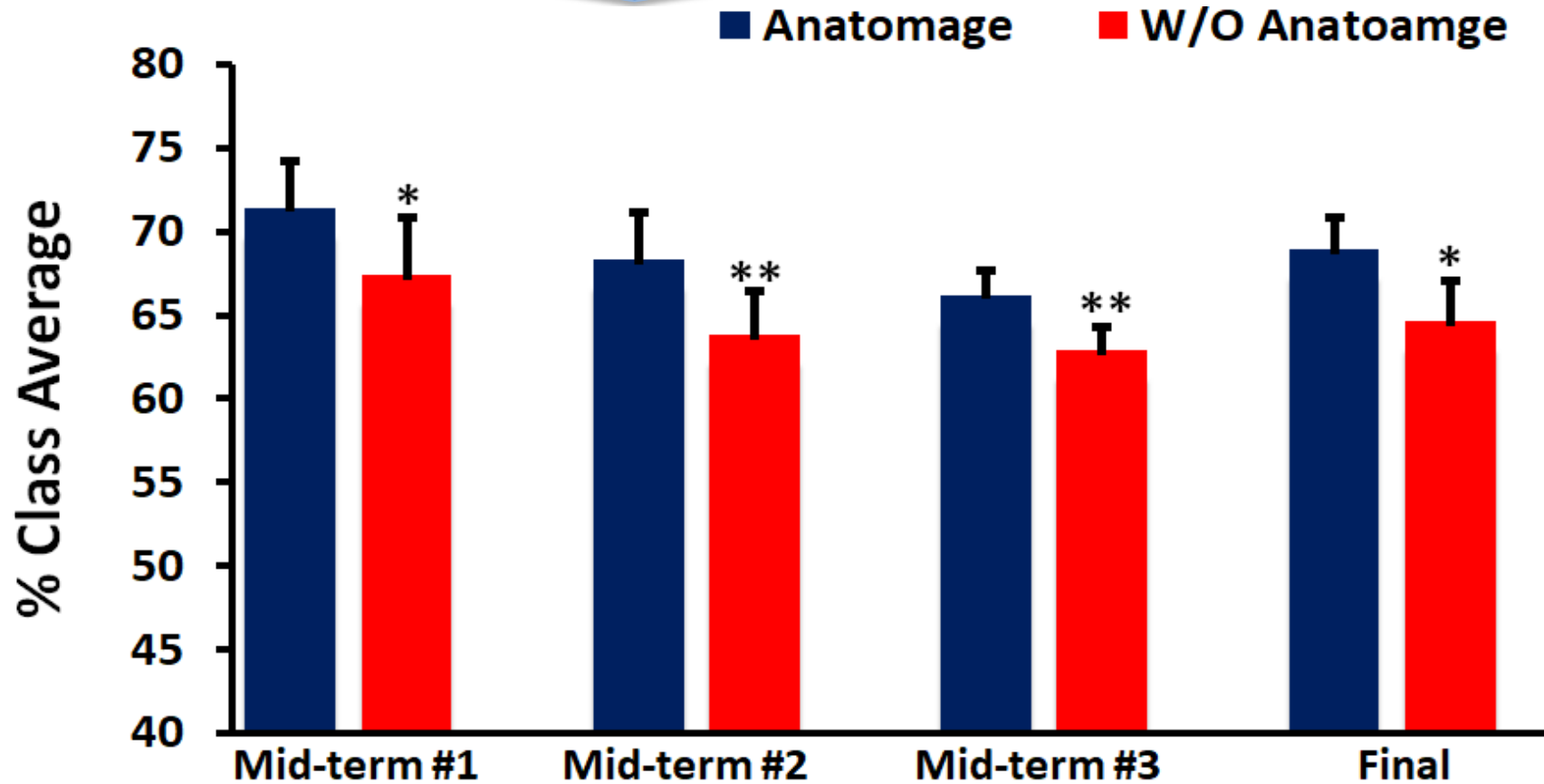
Strategy I

3D Virtual Human Cadaver- Anatomage



Strategy I

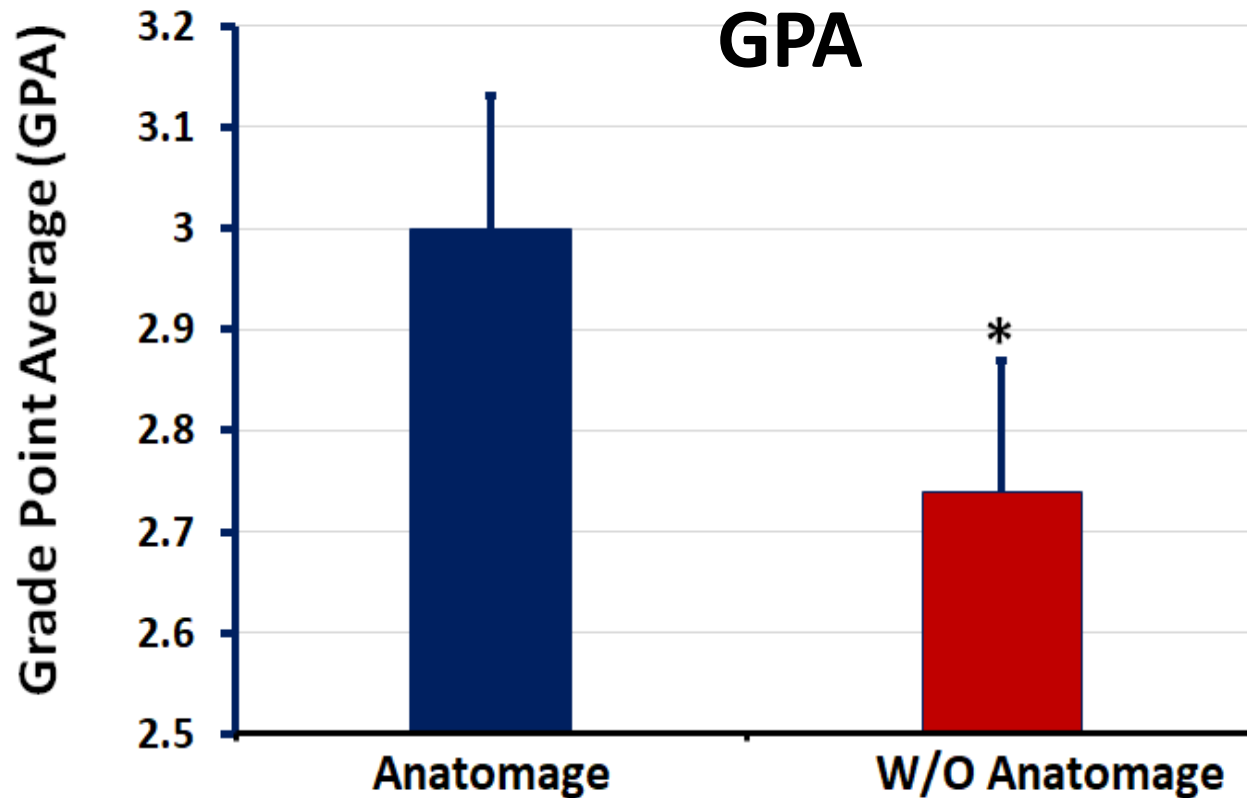
3D Virtual Human Cadaver- Anatomage



Narnaware & Neumeier, 2021

Strategy I

3D Virtual Human Cadaver-Anatomage

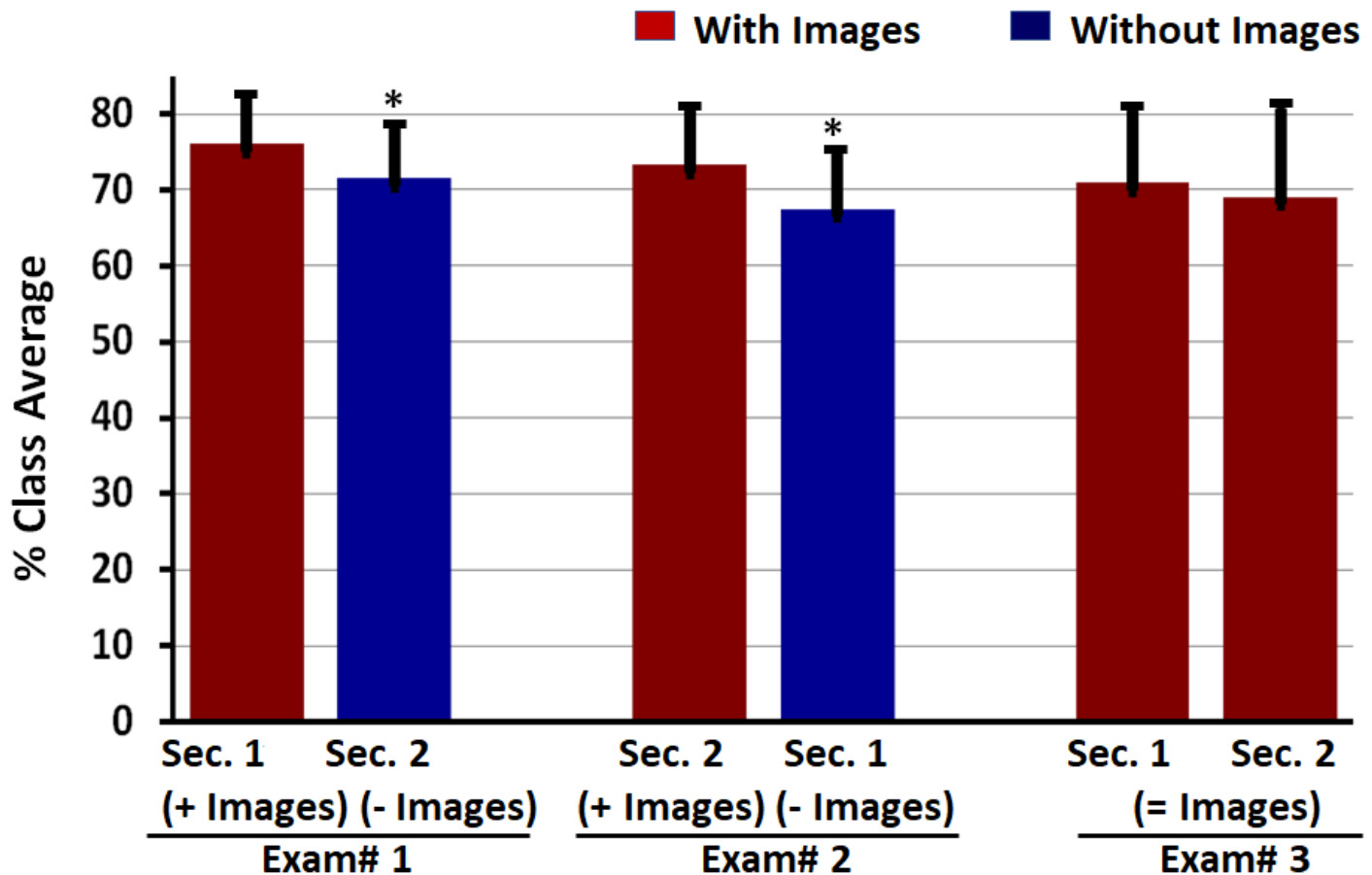


Advantages of Using Virtual Human Cadaver

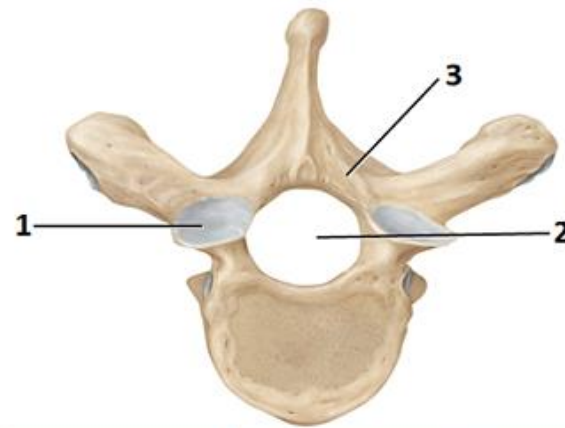
Strategy I *Virtual* *Human* *Cadaver-* *Anatomage*

- Provides a true perception of the human body
- Reduce anxiety related to cadaver use
- Provide a social hub for faculty-student interaction
- Help students to develop a social & communication skills
- Provide visualizing effects that increase learning and alter cognitive load (Custers et al., 2010)
- Help recall anatomical knowledge

Strategy II- *Inclusion of Anatomical Images in Exams*



Narnaware & Cuschieri, 2022



Strategy II-
Inclusion of
Anatomical
Images in
Exams

Questions	% Score with Text + Image	% Score with Text only
1. Which structure serves as the attachment site for the 'facet for the head of the rib'?	56.9%	25.9%
2. Which structure serves as a passage for the spinal cord?	79.2%	68.8%
3. Which structure separates the transverse process from the spinous process?	68.0%	59.7%

Narnaware & Burleson, 2018

Strategy II
Inclusion of
Anatomical
Images in
Exams

Advantages of Images in Exams

- Increase visualization
- May reduce exam anxiety and stress in students
- Alter cognitive load (Custers et al., 2010)
- Help confidence in learning
- Help recall anatomical knowledge
- Provide a hint to an answer

The Impact of On-line and In-class Activities

Strategy III *On-line & In-class Activities*

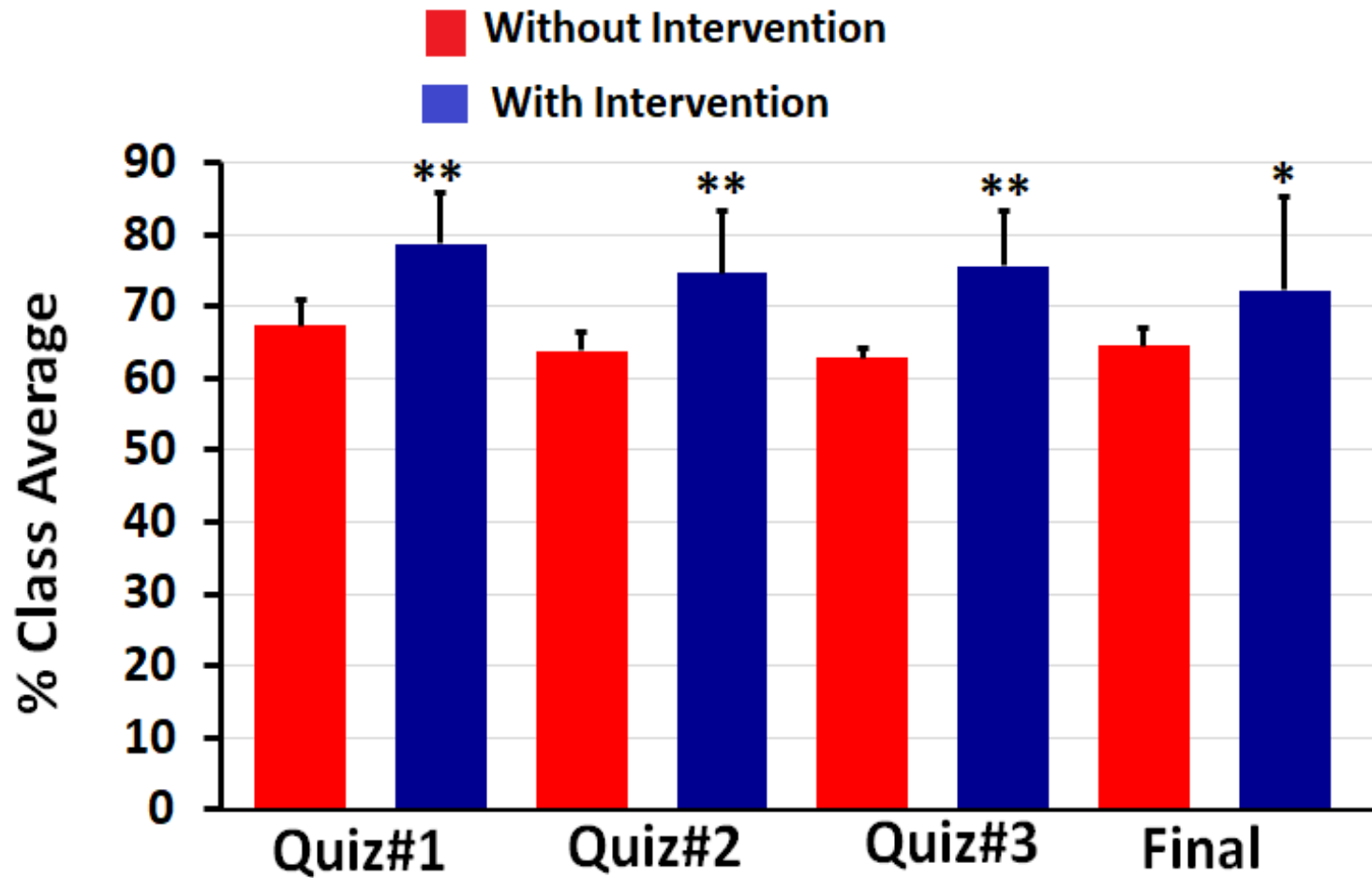
On-line Activities (outside the class):

- WileyPlus & Orion
- Muscle assignments
- Practice questions on anatomy contents

In-class Activities:

- Kahoot quizzes
- In-class quizzes, discussion & engagement
- Anatomical matching questions

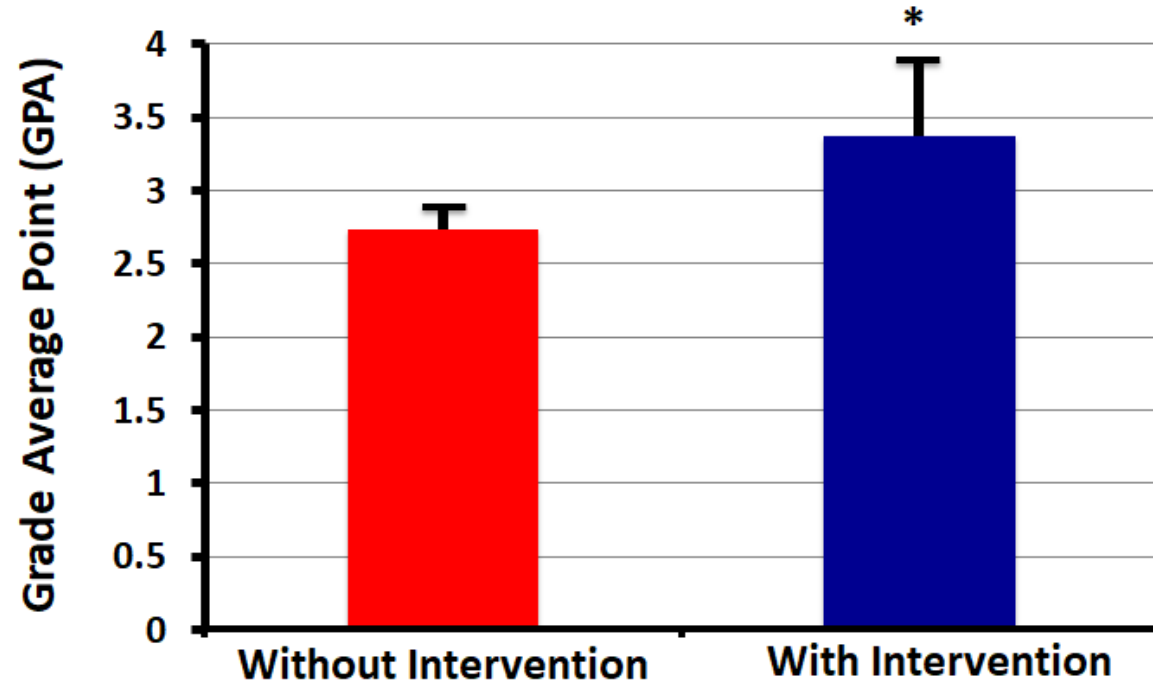
Strategy III
On-line &
In-class
Activities



Narnaware & Chahal, 2019

Strategy III
On-line &
In-class
Activities

GPA

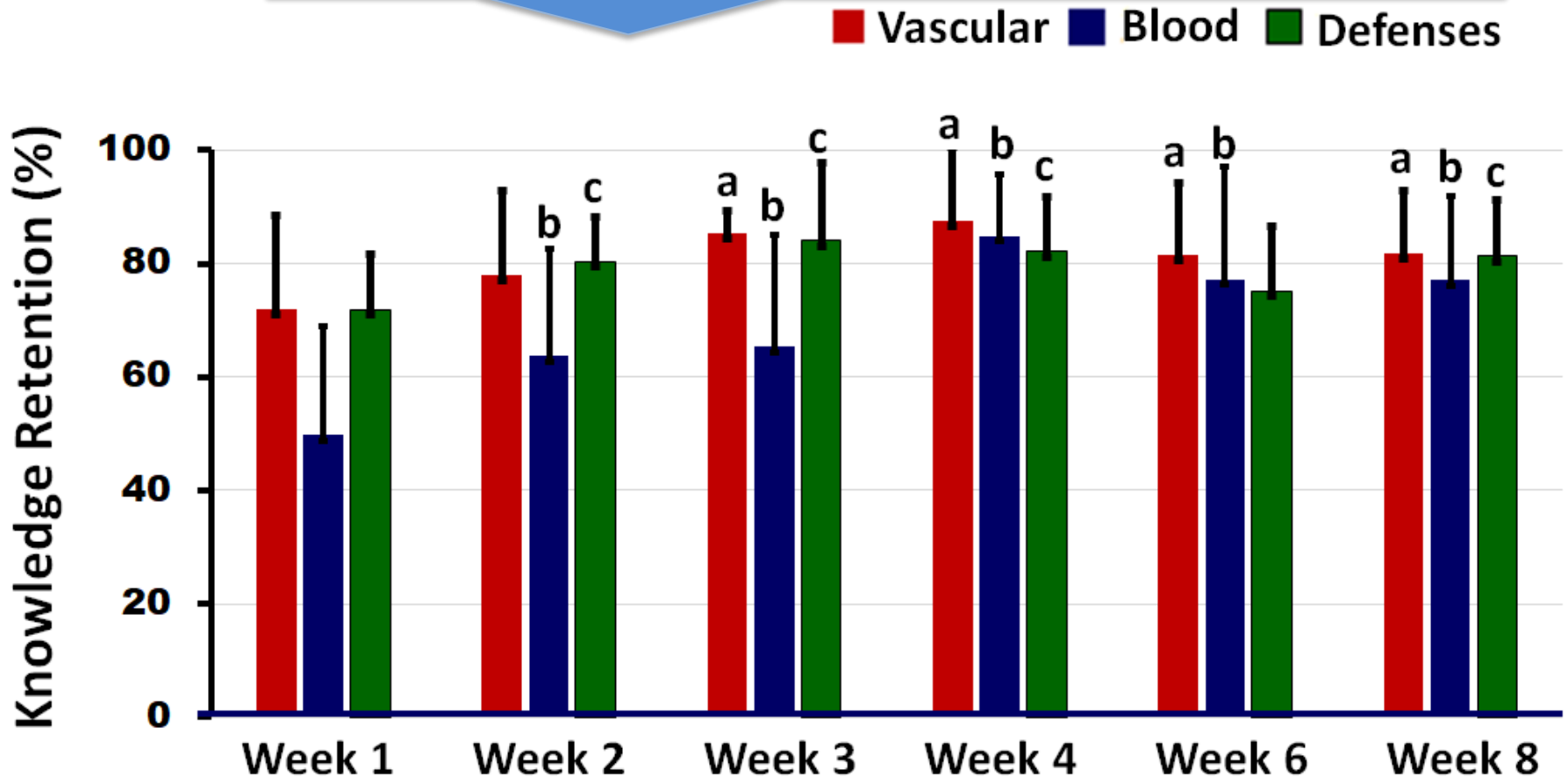


Advantages of On-line & In-class Activities

- The academic performance (Class average & GPA)
- Help gain communication and social skills
- Promote active learning
- Improve class attendance and engagement
- Develop critical thinking
- Retain a long-term anatomical knowledge

Strategy IV

Content Reinforcement (Repeated Testing)



Future Directions



Conclusion



➤ Multi-modal, blended pedagogical approaches may foster students engagement, improve academic performance, provide social & communication skills, critical thinking, & may help retain a long-term knowledge in students.

Acknowledgements

Prof. Melanie Neumeier- Collaborator

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Prof. Karen Buro- Statistician

Celina Vipond- Research Assistant

Thank you

