

UNT

HEALTHTM SCIENCE CENTER



**Building Higher
Order Thinking
Skills in
Tomorrow's Health
Care Professionals
A Quality Enhancement
Plan for the GSBS**

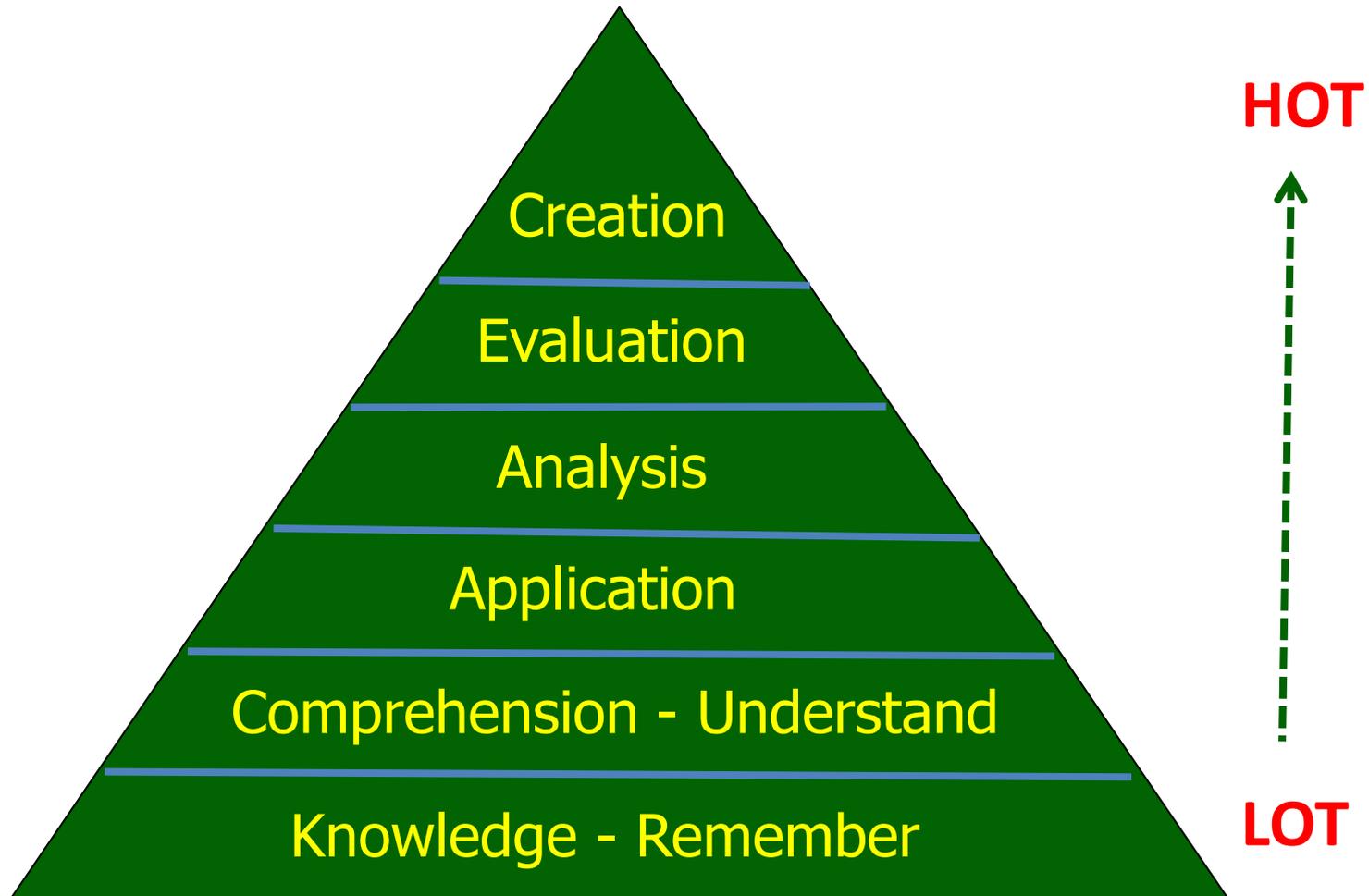
Focus of the QEP at UNTHSC:

To improve students' Higher Order Thinking (HOT) skills across the health sciences curricula through faculty development in curricular delivery methods and course redesign

HOT – What???

- **Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.**

Bloom's Taxonomy - Traditional



QEP Goal for the GSBS

- **Goal:** To achieve measurable improvement in student learning outcomes
- **By training faculty** members in higher orders intellectual learning and teaching methods and consequently advancing these higher order thinking skills in students
- **Approach:** Transform core physiology courses offered to students in the Masters Degree in Medical Science (MS) program from strictly lecture-based to more application-based learning

Past and “Current” Teaching Methods in Physiology

Past Teaching Methods	Current Teaching Methods
<ol style="list-style-type: none"><li data-bbox="59 596 745 762">1. Lecture by faculty (95%)<li data-bbox="59 796 813 962">2. Clinical correlations within lectures (5%)	<ol style="list-style-type: none"><li data-bbox="865 596 1769 662">1. Lecture by faculty (65%)<li data-bbox="865 696 1792 762">2. Clinical correlations (5%)<li data-bbox="865 796 1630 962">3. Case-based group presentations (30 %)

Past Student Assessment Measures	Current Student Assessment Measures
<ol style="list-style-type: none"> 1. Student Course Evaluations 2. Written exams 3. Acceptance in Medical school within 1 year graduation 	<ol style="list-style-type: none"> 1. CCTST 2. CCTDI 3. Rubric-based written exams 4. Focus group analysis 5. Clinical case scenario creation and presentations 6. HOT Assessment* 7. Performance-based interviews and evaluations 8. Acceptance in Medical school within 1 year graduation

What did we do differently this year?

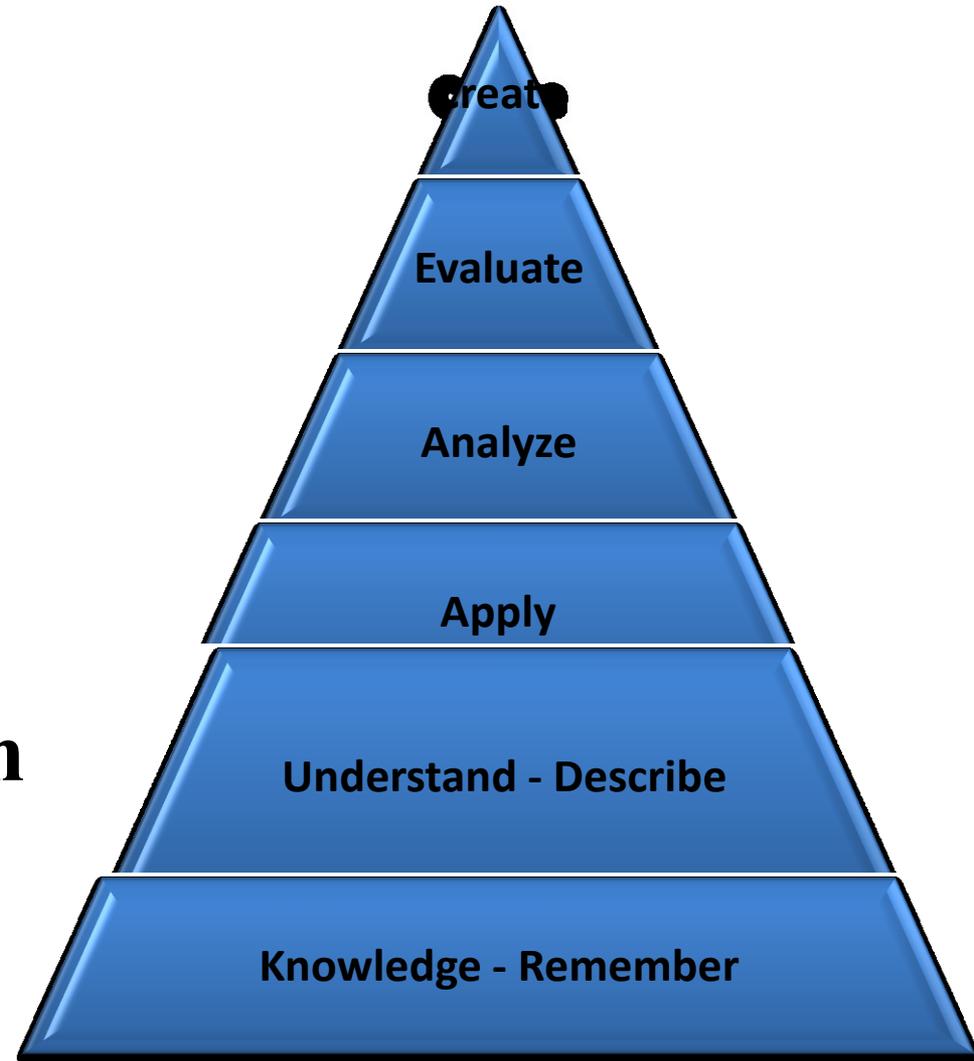
- **HOT Assessment before & after course**
- **Asked students to come to class prepared**
- **iClicker questions during lecture**
- **Provided practice questions**
- **Case/application scenarios in lectures**
- **Clinical case presentations by students**
- **1st, 2nd, 3rd order questions on exam**
- **Post exam review**

HOT Assessment

- **Assessment of our success in achieving a measurable improvement in student learning**
- **HOT assessment, CCTST, and CCTDI**
- **Incentive: 25 bonus points**

Hot Assessment

- **Reading selection followed by several multiple choice questions**
- **Includes tables, graphs**
- **Questions range from 1st to 2nd to 3rd order**
- **Show document**



Hot Assessment: Pre- and Post-Course Results

Pre-Course

- **Class average = 73%**

– #A = 2

– #B = 53

– #C = 40

– #F = 52

Post-Course

- **Class average = 78%**

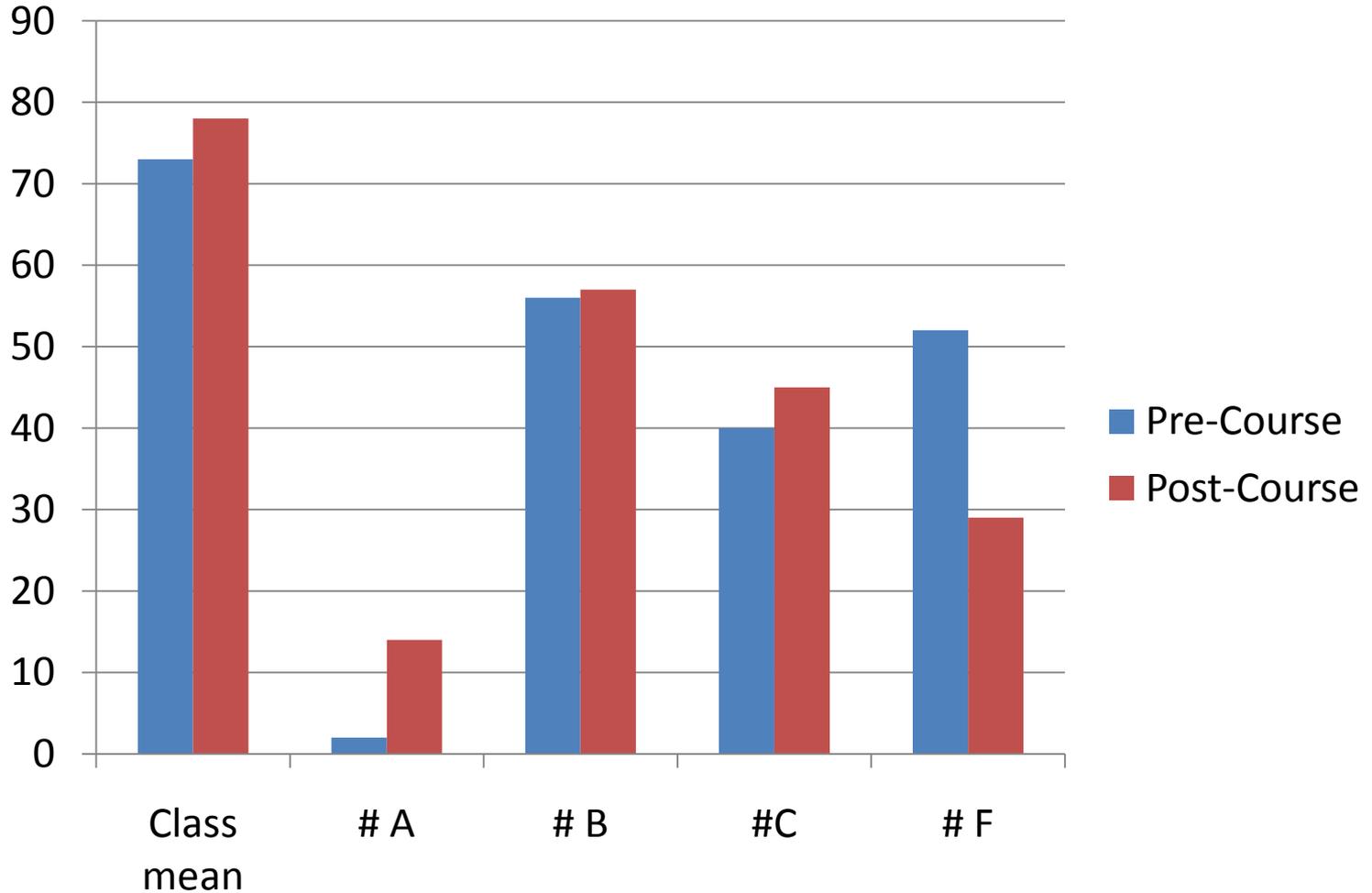
– #A = 14

– #B = 57

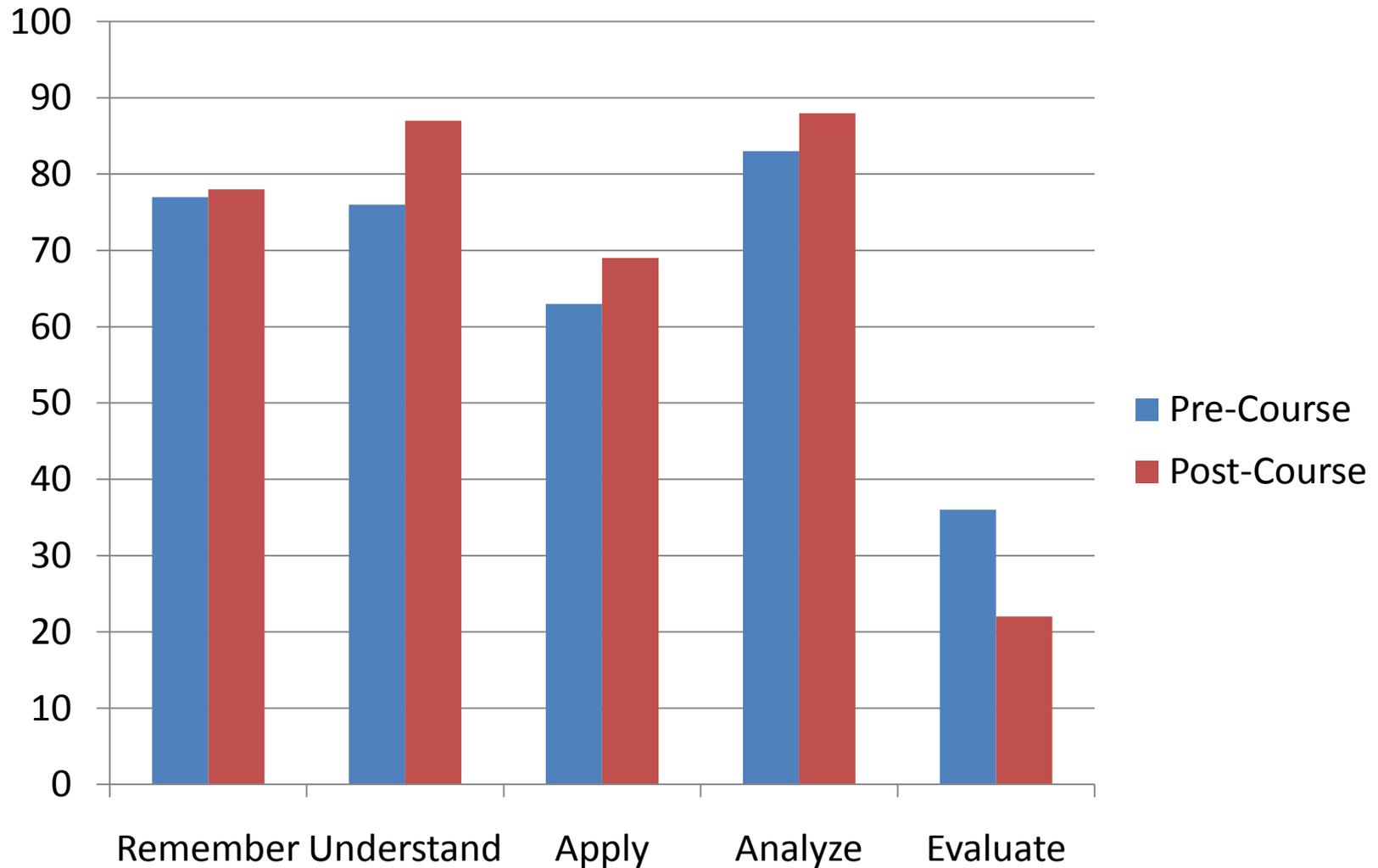
– #C = 45

– #F = 29

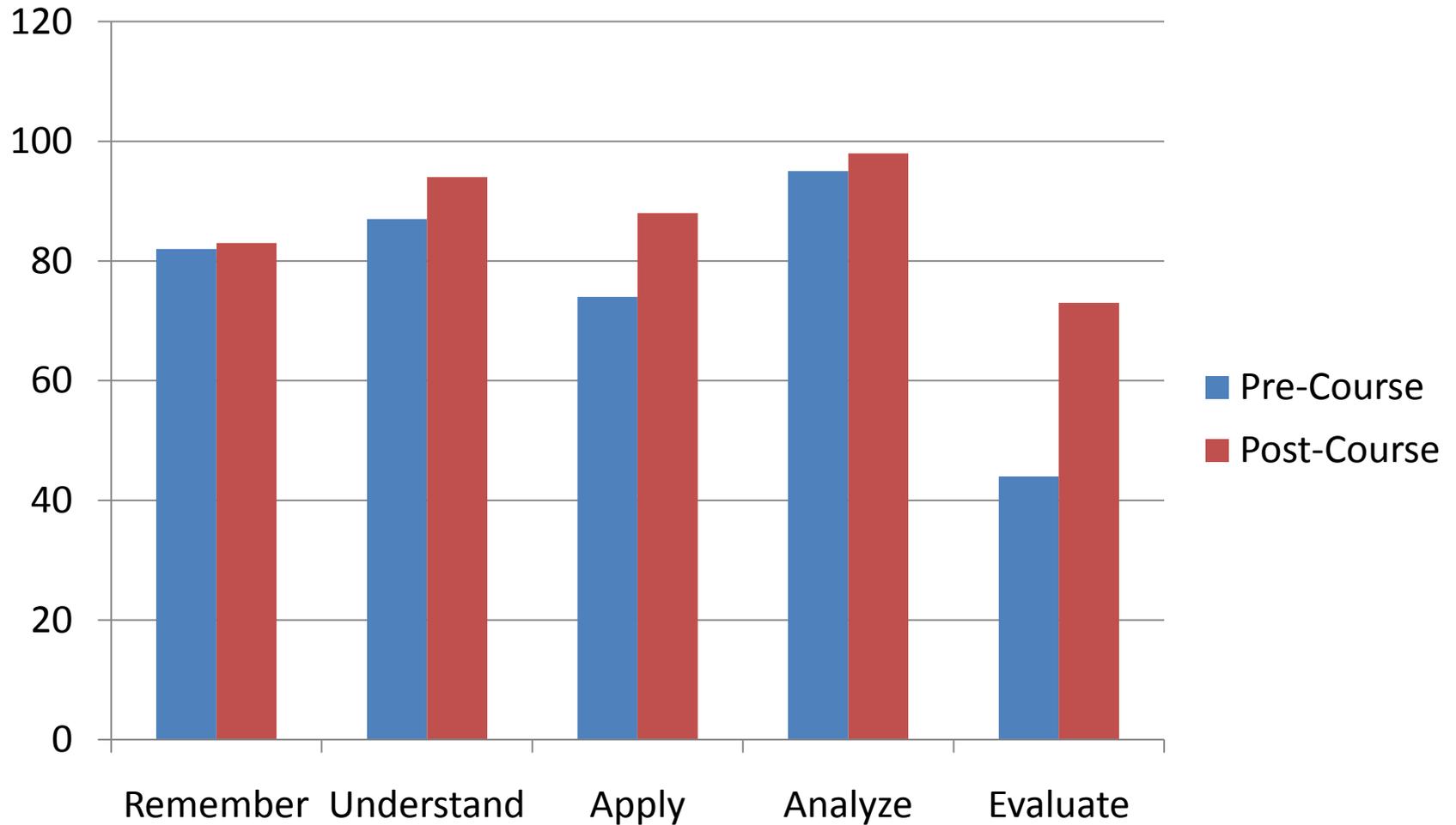
Hot Assessment: Pre- and Post-Course Results



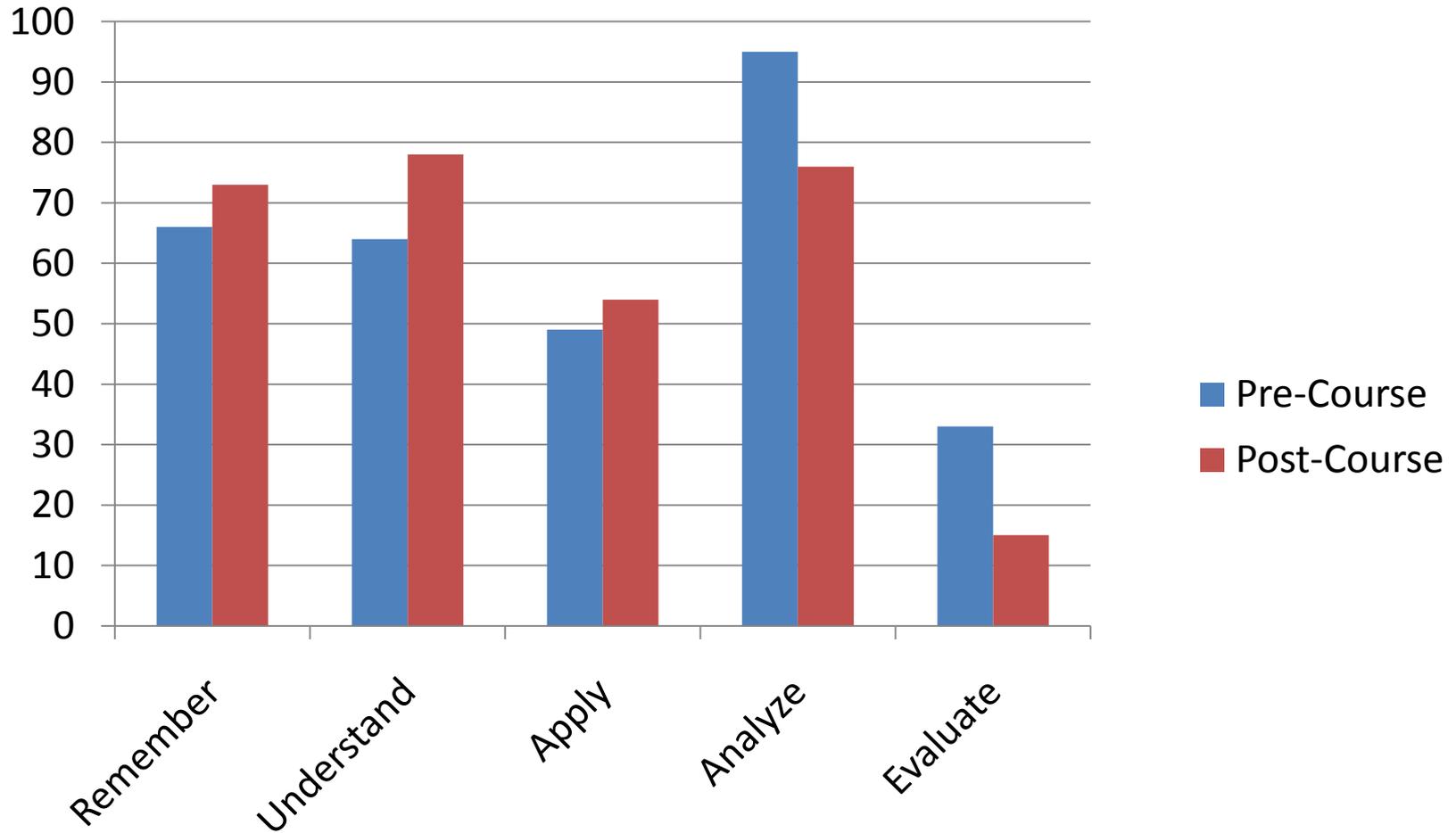
Entire Class



Upper Third of Class



Lower Third of Class



Case Study Presentations

- **One-hour in length**
- **Students randomly assigned to a group and given a clinical case**
- **PowerPoint-based presentation to the class**
- **Each case has several questions**
- **Each group will be responsible for how the work is to be divided amongst its members**
- **3-5 iClicker style questions to review major concepts presented in the case**
- **Graded using a rubric**
- **Can earn up to 40 points; each group member earns the same grade**
- **Instructor presented first two cases to model expectations**

Clinical Cases

Group #	Case #	Title of Case
Gwartz	1	Cardiac Autonomic Neuropathy in Diabetes
Gwartz	2	Myasthenia Gravis
1	3	Congestive Heart Failure
2	4	Peripheral Circulation Disorder
3	5	Myocardial Infarction
4	6	Mitral Stenosis
5	7	Pulmonary Edema
6	8	COPD
7	9	High Altitude
8	10	Gastrinoma
9	11	Vomiting

Rubric

- **Professional Delivery**
- **Accuracy of Content**
- **Learning Objectives**
- **Organization**
- **Quality of iClicker Questions**
- **Ability to Answer Questions**
- **Length of Presentation**
- **Enthusiasm**
- **Powerpoint Posted**
- **Exceptional – 4 points**
- **Very Good – 3 points**
- **Fair – 2 points**
- **Poor – 1 point**

Clinical Case #3: Cardiac Pump & CHF

Case Presentation

- **70-year-old man was admitted to the hospital with shortness of breath, severe fatigue and weakness, abdominal distension, and swelling of ankles**
- **At night he requires four pillows and often wakes up because of acute air hunger**
- **His history revealed episodes of angina pectoris and a progressive shortness of breath with exertion for several years**
- **On examination the chief abnormalities were slight cyanosis (bluish cast to the skin), distension of the neck veins**

Clinical Exam

- **Height/weight: 5'-7"/182 lbs; Temp: 37.2 °C; Respiration: 20 per minute**
- **Pulse: 110 bpm, diastolic gallop rhythm (sounds like galloping horse)**
- **BP: sitting: 115/80 mmHg**
- **Rales (crackling sounds) at the lung bases bilaterally**
- **Chest x-ray: enlarged heart and diffuse density (indicative of fluid in the lungs) at both lung bases**
- **ECG: normal sinus rhythm. Q waves, left axis deviation**
- **Abdominal exam: enlarged liver and excess fluid in the abdomen**
- **Edema: noted at ankles and over the lower tibias**
- **Treatment: included bed rest and administration of digitalis and a diuretic**

Questions

- **Predict the cardiac output and stroke volume levels for this patient and explain your hypothesis. (evaluate)**
- **Identify the mechanism that is indicated by the distension of the neck veins and enlargement of the liver. (understand)**
- **Explain what you would expect to find in measuring the ejection fraction and residual volume of the patient. (evaluate)**
- **Appraise whether the force and velocity of cardiac contraction are normal for this patient and if there is a relationship between these two variables. (analyze).**
- **Conclude the effect the patient's condition may have on cardiac contractility and dP/dt . (evaluate)**

Questions

- **Explain the importance of atrial contraction for ventricular filling for this patient. (evaluate)**
- **Explain the impact of a change in peripheral vascular resistance for this patient. (evaluate)**
- **Explain why the heart rate is slightly elevated. (apply)**
- **Predict the effect of changing preload. (apply)**
- **Predict the effect of changing afterload. (apply)**
- **Defend why you would expect the arteriovenous oxygen difference to be normal or abnormal. (evaluate)**
- **Discuss why the heart is enlarged. (understand)**

Questions

- **Analyze the cause/s of why the patient is short of breath (analyze)**
- **Explain why the patient has edema of the legs. (apply)**
- **Explain why a diuretic was given and how it works. (apply)**
- **Determine if there should be any dietary restrictions and if so, identify what they would be. (analyze)**
- **Determine if digitalis would be helpful for this patient and explain why. (evaluate)**
- **Assess whether a calcium channel antagonist would be advantageous or not, and explain why. (evaluate)**
- **Determine if norepinephrine would be helpful for this patient and explain why. (evaluate)**
- **Determine if phlebotomy or a transfusion would be helpful for this patient and explain why. (evaluate)**

Student Presentation

- **Show group's slide presentation**

Grade Comparison

2009-10

Class average = 78%

– #A = 32 (32%)

– #B = 47 (47%)

– #C = 15 (15%)

– #F = 6 (6%)

2010-11

Class average = 85%

– #A = 36 (24%)

– #B = 93 (85%)

– #C = 18 (12%)

– #F = 2 (1%)

What will we do differently next year?

- **Increase physiology faculty involvement**
- **Incorporate small group exercises**
- **HOT Assessment:**
 - **Review pre-test for flawed questions and administer during fall semester**
 - **No incentive bonus points**
 - **Post-test incorporated as a comprehensive final exam at the end of Physiology course**
- **Clinical Cases**
 - **Write additional cases**
 - **More faculty participation**

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