

Making Physiology Relevant to Students' Lives

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Background

- SSI 2013
- Subaward 2013
- CE requirement at KBCC
- Administrative support at KBCC
- SSI 2014 poster Presentation

Goal:

Curricular redesign of Anatomy and Physiology Course to improve understanding and retention of the material

A&P I: Skeletal, Muscular, Nervous, Integumentary Systems

A&P II: Digestive, Endocrine, Cardiovascular, Lymphatic, Respiratory, Urinary, Reproductive

Learning Objectives

- Understand and apply LOGIC to processes of human physiology
- Demonstrate understanding of functional relationship between organs and organ system
- Conduct on-line research on health related issues and interpret data
- Engage in scientific writing, group work, science communication
- Demonstrate proficiency in the course content

Contextualizing A&P II

- **Food Centered theme for the CE component**
- **Student –driven inquiry into a food related social issue**
- **Emphasis on relevance of concepts taught in A&P to health-related social concerns**
- **Integrative approach to function of organ systems**
- **Scaffolding assignments**

Please formulate a topic you would like to research.

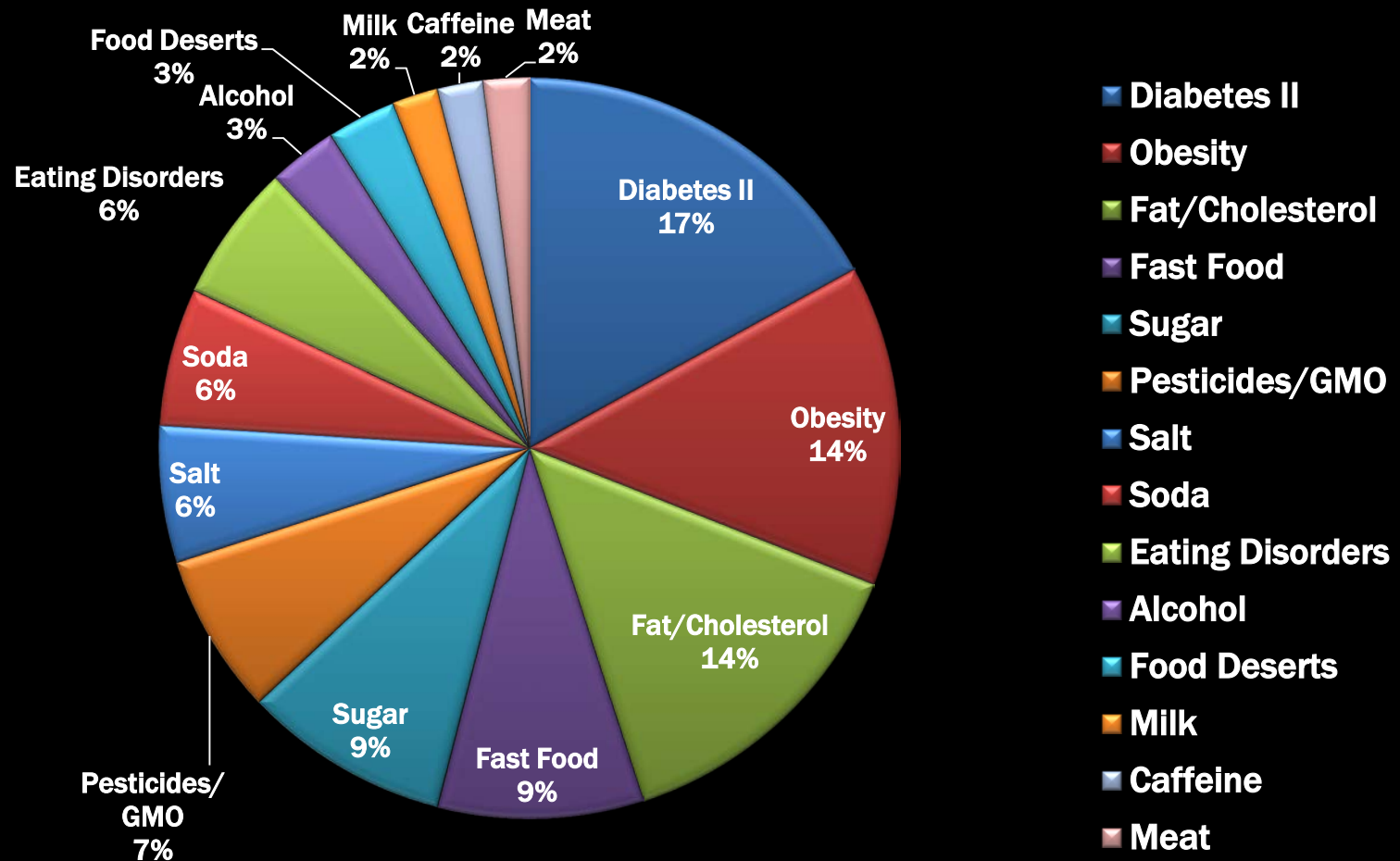
Your research question should be centered on a food-related social issue that is relevant to the content of our course.

Write your research question.

Food-Related Social Issues: Distribution

Fall 2014 + Spring 2015

N=68



Civic Engagement Prompts

For your ***CE assignment #1***, please formulate a topic you would like to research.

Your research question should be centered on a food-related social issue that is relevant to the content of our course.

Write your research question.

Find a **graph** or a chart depicting data relevant to your topic, copy it into your document and explain the results in your own words.

Comment on how you would **teach** a concept covered in chapters on Digestive and Endocrine systems using your food-related issue.

Cite the source, if on line: www.....

Please submit your work as a Microsoft word doc through BB

Limit to 2 pages

For your ***CE assignment #2***, continue to investigate your social issue related to food

1. Why do you think it's an important issue? Is it prevalent? Does it affect certain groups of people more than others?
2. Select one **graph** or chart that shows relationship between your issue and Cardiovascular system. Interpret the results and provide your conclusions
3. Choose one topic from chapters on Cardiovascular or Immune System, a concept in **physiology** or maybe an anatomical structure and **explain in detail** how you would **teach** it using your issue
4. Suggest possible **solutions** for the issue of your choice

Length: 2-3 pages

For your ***CE assignment #3***, continue to investigate your social issue related to food

1. Select one **graph** or chart that shows relationship between your issue and respiratory or urinary systems. Interpret the results and provide your conclusions
2. Choose one topic related to chapters on Respiratory or Urinary systems - a concept in **physiology** and explain in detail how you would **teach** it using your issue
3. Include references

Length: 2-3 pages

	Digestive System	Endocrine System
Diabetes II	Gastroparesis- slow gastric emptying	Insulin resistance, glucose concentration
Obesity	motility in the GI tract, impact on absorption, Gastro esophageal Reflux disease, erosions of the esophagus, heartburn, esophageal cancer, chemical digestion, emulsification and absorption of lipids	Insulin, glucose concentration in blood, diabetes, pituitary gland, thyroid gland, metabolism, receptor mediated Leptin resistance
Sugar	Carbohydrate digestion and absorption, liver metabolism	Insulin, glucagon
Salt	Sodium-glucose co-transport for absorption	Atrial Natriuretic peptide, aldosterone
Eating Disorders	Teeth – Calcium deficiency, teeth enamel and acid, laxatives, constipation, bloating, vomiting, irritation of intestines	Hypothalamic-pituitary-adrenal axis, gonadotropic hormones
Alcohol	Heartburn, gastritis, pancreatitis, liver disease	Antidiuretic hormone, cortisol
Milk	Protein and lipid digestion, lactose intolerance	bovine growth hormone, insulin growth hormone
Caffeine	Low ph, ulcers, reduction in HCL acid, reduction digestive enzyme activity, protein digestion, absorption of minerals, stimulation of gastric emptying	Thyroid, cortisol, epinephrine, stress

	Cardiovascular System	Urinary System
Diabetes II	Hypertension, high blood LDL, heart disease, stroke, heart failure, atherosclerosis: lipid accumulation, oxidation, peroxidation, and formation of the fibrous cap	Kidney disease, diabetic ketoacidosis, bacterial growth, urinary tract infections, difficulty urinating or urinary incontinence, urine production, glucose in the urine, dehydration, damage to filtration membrane, diabetic nephropathy
Soda	cardiac remodeling- thickening of the heart wall, heart disease, high blood pressure, stroke	Excess of calcium and kidney stones, metabolic acidosis
Eating Disorders	Heart failure, thinning of the heart wall, heart valve collapse, low blood pressure, weakening of the heart muscle, blood pressure, blood volume, imbalance in sodium, potassium ions, hydrogen ions, bicarbonate and chloride imbalance, diuretics, abnormal heart rhythms, reduced blood flow	Kidney stones, electrolyte imbalance, production of urine, dehydration, metabolic alkalosis
Alcohol	Vasoconstriction, increased blood pressure, cardiomyopathy, edema, irregular heartbeat, stroke, blood flow	Urine output, antidiuretic hormone, blood volume
Caffeine	Low ph, ulcers, reduction in HCL acid, reduction digestive enzyme activity, protein digestion, absorption of minerals, stimulation of gastric emptying	Incontinence, dehydration, diuretic properties

- **Obesity:**
- **According to the WHO, the cause of Obesity is an increased intake of calorie dense food and a decrease of calorie usage. In the American society, it is a social norm to make dinner plans with friends and family to eat out at a restaurant. During these social gatherings there is consumption and consumption of food. Now, children are not as active as they used to be because of increase in technology. These two factors contribute to the increase in caloric intake and the decrease of caloric expenditure.**
- **Additional fat tissue in the body needs oxygen and nutrients in order to live, which requires the blood vessels to circulate more blood to the fat tissue. This increases the workload of the heart because it must pump more blood through additional blood vessels. More circulating blood also means more pressure on the artery walls. Higher pressure on the artery walls increases the blood pressure. Coronary artery disease is also more prevalent because fatty deposits build up in arteries that supply the heart. Narrowed arteries and reduced blood flow to the heart can cause chest pain (angina) or a heart attack. Blood clots can also form in narrowed arteries and cause a stroke.**

- **Diabetes type II**
- **Type 2 diabetes have been on a rapid rise since the 1990s and is projected to keep ascending with very little sign of tapering. But does the average person understand the causes and how it can be prevented or delayed?**
- **Diabetic kidney disease is a complication that occurs in some people with diabetes. It can progress to kidney failure in some cases. The raised blood glucose level may cause some proteins in the glomeruli to link together. These 'cross-linked' proteins can trigger a localized scarring process. This scarring process in the glomeruli is called glomerulosclerosis. It usually takes several years for glomerulosclerosis to develop and it only happens in some people with diabetes. As the condition becomes worse, scar tissue (glomerulosclerosis) gradually replaces healthy kidney tissue. As a result, the kidneys become less and less able to do their job of filtering the blood. This gradual 'failing' of the kidneys may gradually progress to what is known as end-stage kidney failure**
- **One of the most frequent of cardiovascular disorders stemming from diabetes is atherosclerosis – the hardening of the inner walls of blood vessels by the accumulation of cholesterol fats in the tunica intima. The forming clump reduces the diameter of the vessel lumen, which has a dramatic effect on blood flow. As the rate of blood flow is proportional to the diameter of the vessel to the fourth power, any change in diameter will cause a significant obstruction for blood. Although atherosclerosis has potential to occur without diabetes, diabetes is considered one of the highest risk factors and causes of atherosclerosis.**

- **Soda:**
- **When you hear the term cardiovascular disease, you automatically think that it is a direct result from high cholesterol and a high fat diet. The truth is that sugar causes more heart disease than fat. The thing about sugar is that it causes inflammation in the arterial walls and causes an insulin spike.**
- **The direct influence of soda on the cardiovascular system isn't quite understood yet. However, these findings should impose discretion in people. The sugar in regular soda causes weight gain, along with the artificial sweeteners in diet soda, which are believed to trick your body into consuming more calories. Weight gain and obesity increase the risk for atherosclerosis, which is the thickening and narrowing of the arterial walls. Atherosclerosis has been shown to be a direct link to myocardial infarction (a heart attack), and can also cause blood clots and strokes. When the vessel walls thicken, it can cause plaque to build up more easily, possibly forming deadly clots that can travel somewhere else into the body as an embolus. When the clot gets stuck in the heart, it can cause the heart attack, and when stuck in the brain, it can cause a stroke. Both of these are deadly as they can keep oxygenated blood from reaching certain parts of the body, therefore causing oxygen deprivation or organ and tissue damage. Also, with a thickening of the arterial walls, blood pressure may increase as there may be decreased contractibility of the vessel walls, and more resistance.**

Social Issues

- **On Food Deserts:** This is a problem for people who need public transportation to travel to area that does supply these healthy foods to have a balance diet. Often working class individuals in these areas may not have the time or the means to obtain healthy food that is beneficial to their health. These individuals will settle for an unhealthy lifestyle that includes a diet that contains mostly processed food, which is high in fats (lipids), and sugar (carbohydrates), due to the simple fact that is easier and cheaper in the short run.
- **On Salt:** The catchy slogans, the expensive add campaigns, and vibrant packaging are all clever ways to distract people from what they're actually being sold. They fail to mention that years of scientific research went into the product to create addicted consumers, through messing with primitive brain chemistry; sodium is used to manipulate consumers.
- Living in the present day, life in the US can be overwhelming, especially for American college student like myself to be focused on what really matters in life; getting a degree to qualify us for our dream jobs and perhaps live the welfare life we all dream of as our American dream. Yet all this can be great to aim for but sometimes we can get carried away; giving up the things that matter the most than our set goals. Example our health. With overwhelming assignments due dates, excelling in classes, coping with stressful relationships and giving more time to get engaged, performing our desired extracurricular activities, one can really not on purpose neglect constructing a proper diet and lifestyle strategy.

Solutions

- **Read the back of labels. Sometimes you cannot avoid the preservatives completely. Purchase the products that seem to have the least amount of preservatives.**
- **If you say you want to eat healthy, don't eat fast food 3 times a day. Limit your intake of processed foods and buy organic, if you can afford to.**
- **Try growing tomatoes or little herbs. It might make you feel good and compel you to eat healthy all the time.**
- **My solution to this social issue to educate the lower class communities and show them how in their own kitchen that they can make a healthy tasty loving meal without a big budget and to still treat yourselves to food they like but in moderation everything takes time but the end results are the best.**
- **I personally think that as far as the five boroughs are concerned, that we have a duty to one another to try and continue opening up healthier establishments, get the word out about bad food and bad beverages. Our children are our future. It needs to start with us and we need to continue to teach them what is best for them.**

Civic Engagement Prompts

Group Presentation

Work with your group on the presentation. Your group will have 10 min to present to the class, so please time your presentations.

In your presentation you will need to address the following:

1. State your social issue
2. Explain why you chose it
3. Why is it important, include graphs
4. How is it relevant to A&P? Give examples from all body systems covered in class
5. How did the A&P course help you understand your topic

You should take turns. You may use PP or other visuals as you will see fit.

The PP presentations should be submitted through BB

Farm Visit Reflections:

Please write about the farm tour.

Address the following:

1. What did you learn? What was the most memorable?
2. Please explain how the farm visit (anything you saw or learned) relates to your research question from the CE #1
3. Include a photograph from your visit and comment on it.
4. Was it a meaningful experience to you? Explain your answer.

Ebola:

Please explain pathophysiology of the Ebola virus using your knowledge of the lymphatic/immune system: the way it is contracted, incubation period, effect on the host cells and organs, possible management and treatment options

In the second part of the essay address Ebola threat if you perceive one, as it relates to our country. Include your suggestions or solutions as well as your concerns.

Food Symposium:

Please describe what you learned at the Food Symposium

Relate it to your topic from the previous assignments



SALG Domains

- Pre “Current Understanding”

2 = not at all -> 6 = great deal

N = 76; Mean Range = 3.6 -> 4.2 (Just a Little to A Lot)

Major in this subject area	68%				
What is your current GPA in a system that assumes a 4.00 as an A (highest score possible)?		2:3.01-3.59	3:2.51-3.00	4:2.01-2.50	5:2.00 or lower
My GPA is...	32%	41%	26%	1%	0%

- Post “Gains in Understanding”

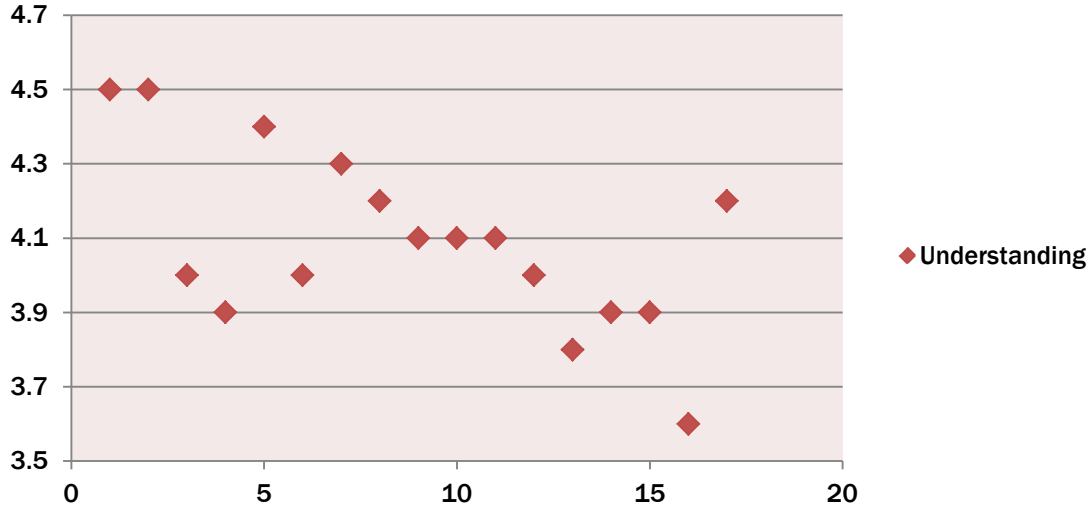
1 = no gains -> 5 = great gain

N = 57; Mean Range = 3.7 -> 4.2 (Moderate to Good gain)

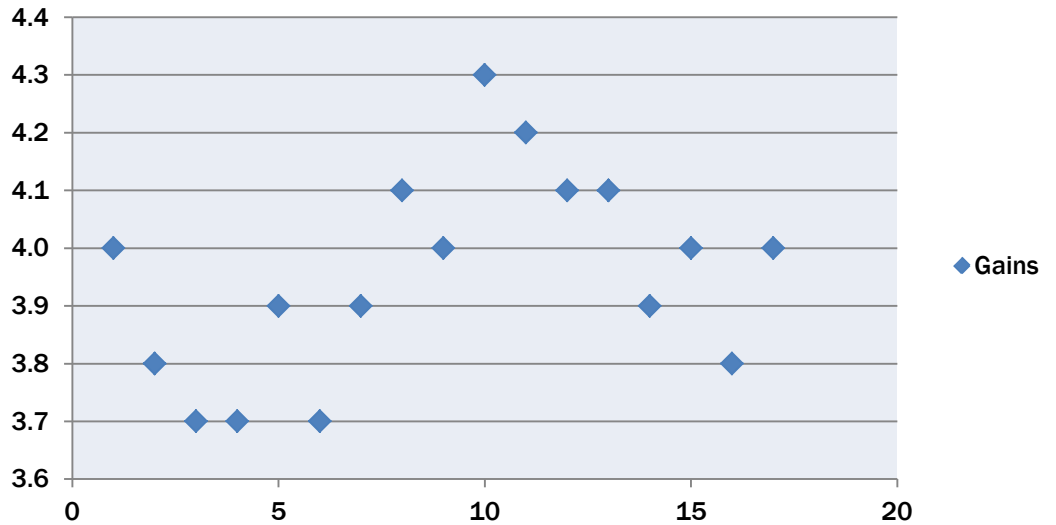
25% attrition rate

	1:not applicable	2:not at all	3:just a little	4:somewhat	5:a lot	6:a great deal	Mean	1:no gains	2:a little gain	3:mode rate gain	4:good gain	5:great gain	9:not applicable	Mean
1 Relationship between structure and function	0%	4%	9%	37%	29%	21%	4.5	0%	11%	17%	36%	36%	0%	4.0
2 Scientific method and its application to life sciences	1%	3%	13%	33%	32%	18%	4.5	0%	13%	29%	26%	30%	2%	3.8
3 Quantitative reasoning and its relationship to life science data	0%	11%	17%	45%	18%	9%	4.0	2%	13%	24%	32%	28%	2%	3.7
4 Ionic currents and membrane potentials	1%	11%	21%	45%	13%	9%	3.9	2%	12%	24%	37%	24%	2%	3.7
5 Microscopic anatomy of cells and tissues	0%	1%	17%	33%	38%	11%	4.4	6%	9%	12%	40%	33%	0%	3.9
6 Types of energy and energy conversion	0%	3%	22%	54%	14%	7%	4.0	4%	15%	16%	38%	24%	4%	3.7
7 Transport mechanisms across cell membrane	1%	3%	12%	43%	32%	9%	4.3	4%	9%	18%	38%	31%	0%	3.9
8 Chemical digestion of proteins, carbohydrates and lipids	0%	7%	20%	34%	25%	14%	4.2	0%	7%	14%	37%	42%	0%	4.1
9 Actions of hormones	3%	7%	21%	32%	29%	9%	4.1	2%	5%	18%	40%	35%	0%	4.0
10 Physiology of the heart	4%	4%	28%	26%	24%	14%	4.1	0%	5%	17%	22%	56%	0%	4.3
11 Blood flow and blood pressure	1%	8%	17%	37%	25%	12%	4.1	0%	4%	19%	26%	52%	0%	4.2
12 Respiratory function and blood oxygenation	4%	8%	18%	32%	26%	12%	4.0	0%	7%	16%	35%	42%	0%	4.1
13 Production of urine	1%	14%	28%	25%	26%	5%	3.8	0%	6%	19%	31%	44%	0%	4.1
14 Inflammation and immune response	0%	9%	28%	36%	22%	5%	3.9	0%	11%	22%	30%	37%	0%	3.9
15 Relationship between flow rate, pressure gradients and resistance	1%	14%	16%	37%	28%	4%	3.9	0%	6%	28%	26%	41%	0%	4.0
16 Chemical and electrical gradients	4%	11%	28%	38%	16%	4%	3.6	2%	10%	28%	33%	26%	2%	3.8
17 Interactions between body systems	0%	5%	16%	42%	25%	12%	4.2	2%	6%	26%	24%	43%	0%	4.0
How studying this subject helps people address real world issues	0%	1%	8%	30%	39%	21%	4.7	2%	4%	20%	33%	40%	0%	4.1

Understanding: 3= a little; 4= somewhat; 5= a lot



Gains: 3= moderate; 4= good; 5= great



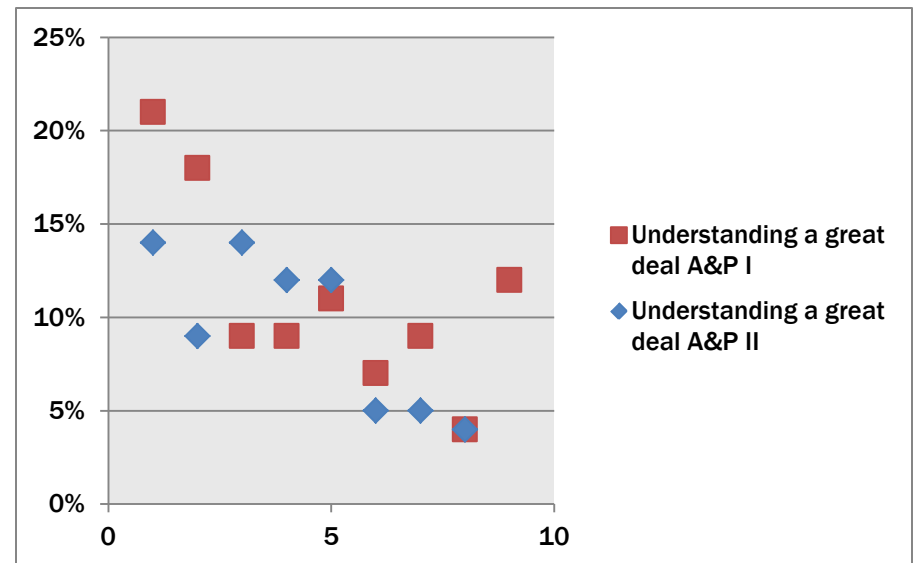
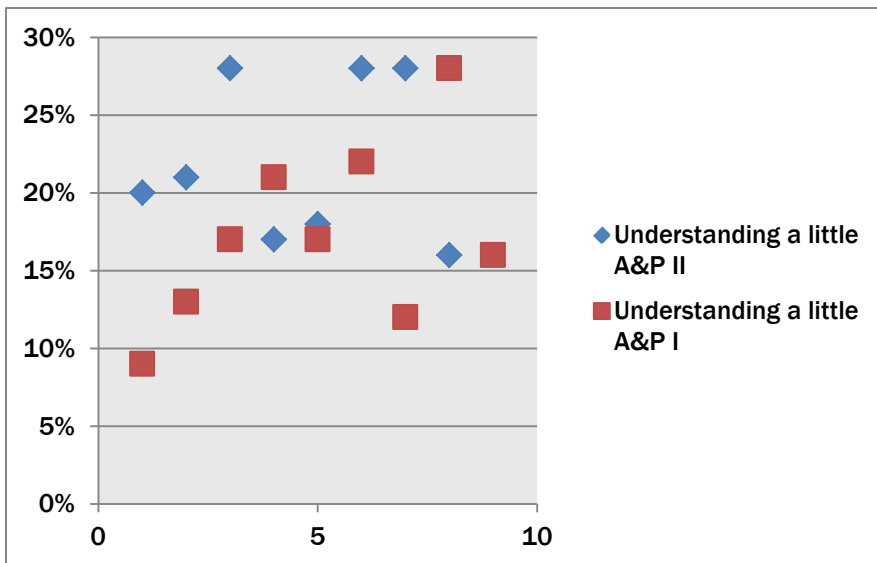
“Understanding” Domain on The Baseline Survey

A&P I

- 1 Relationship between structure and function
- 2 Scientific method and its application to life sciences
- 3 Quantitative reasoning and its relationship to life science data
- 4 Ionic currents and membrane potentials
- 5 Microscopic anatomy of cells and tissues
- 6 Types of energy and energy conversion
- 7 Transport mechanisms across cell membrane
- 8 Chemical and electrical gradients
- 9 Interactions between body systems

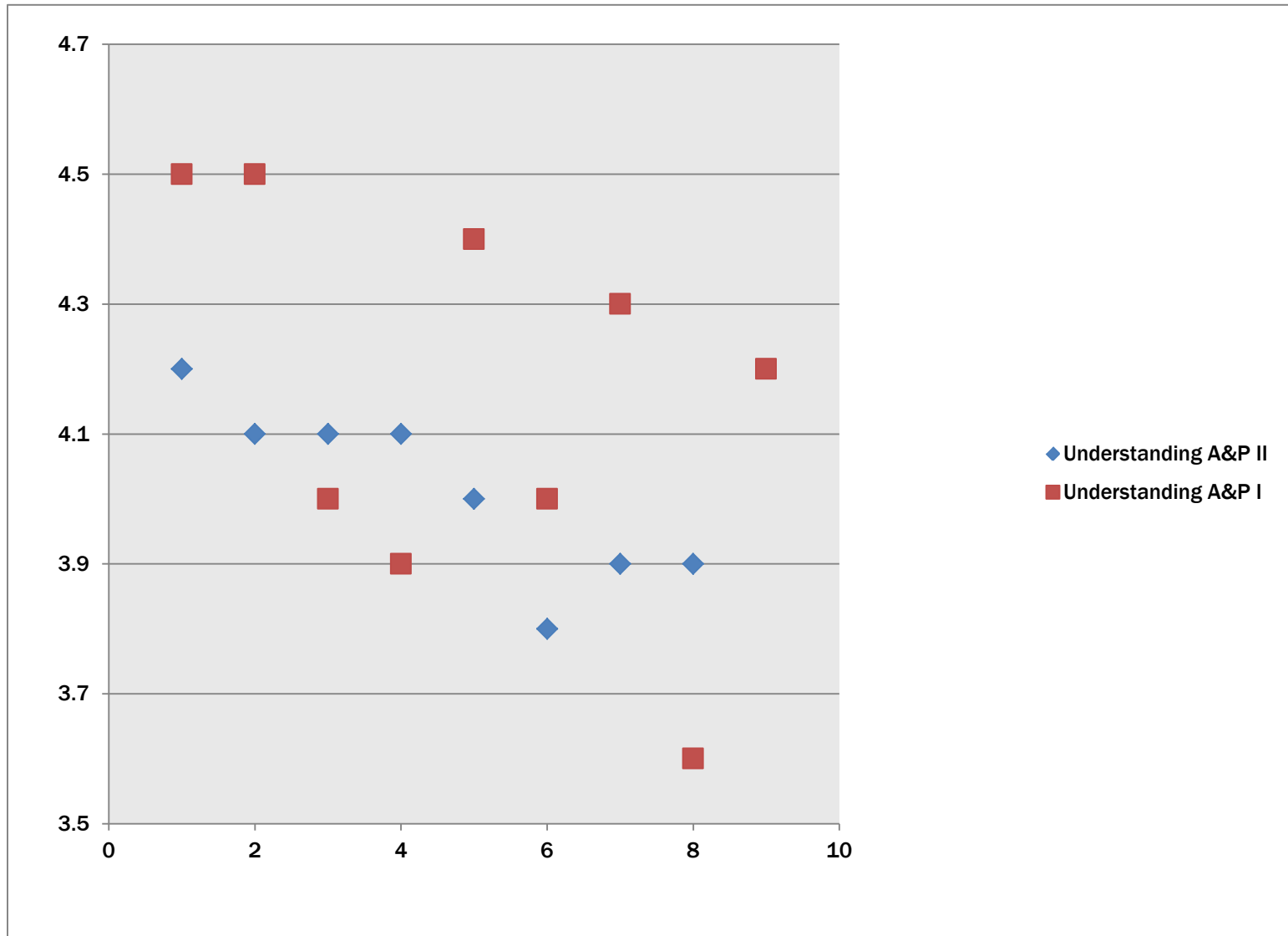
A&P II

- 1 Chemical digestion of proteins, carbohydrates and lipids
- 2 Actions of hormones
- 3 Physiology of the heart
- 4 Blood flow and blood pressure
- 5 Respiratory function and blood oxygenation
- 6 Production of urine
- 7 Inflammation and immune response
- 8 Relationship between flow rate, pressure gradients and resistance

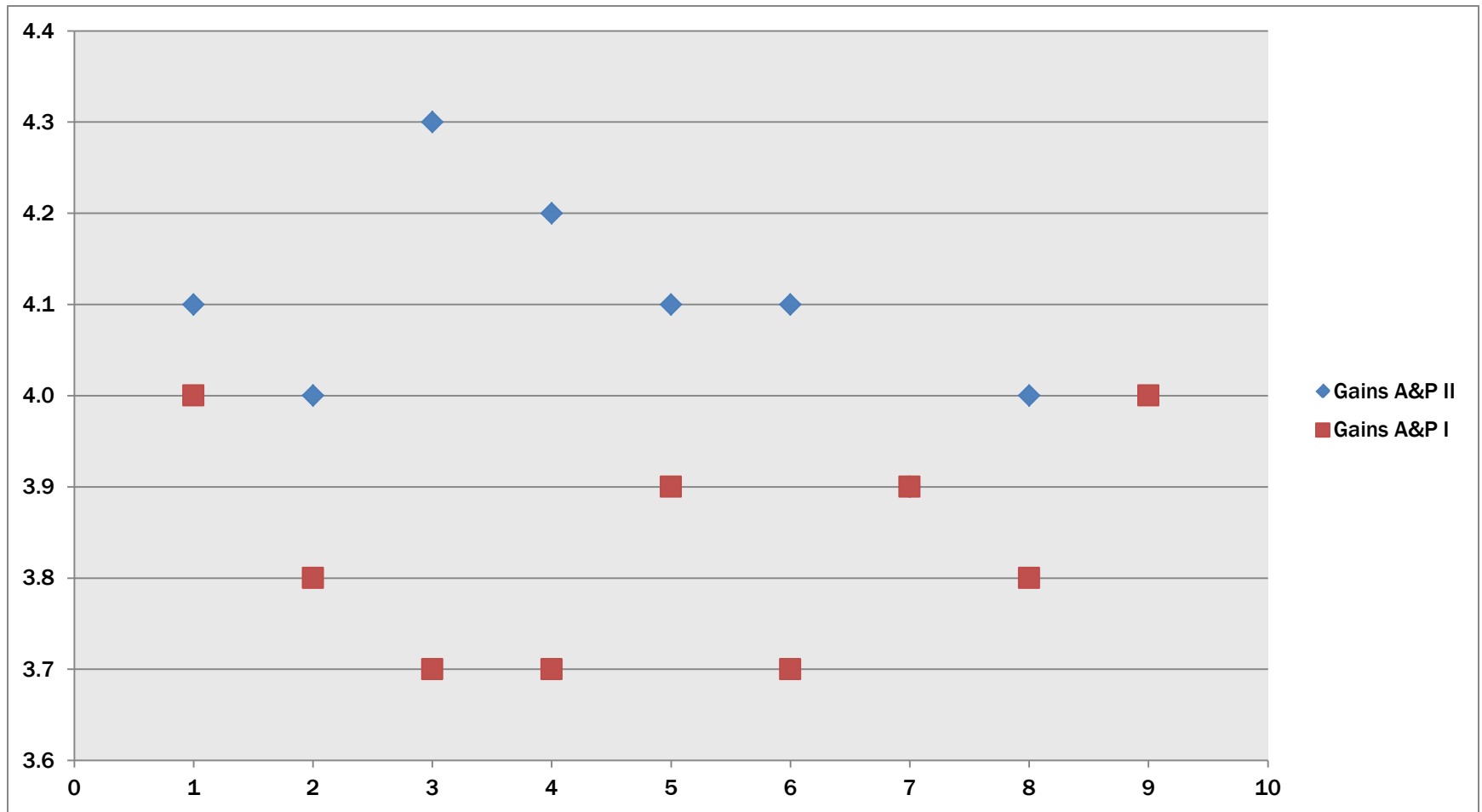


“Understanding” Domain on the Baseline Survey

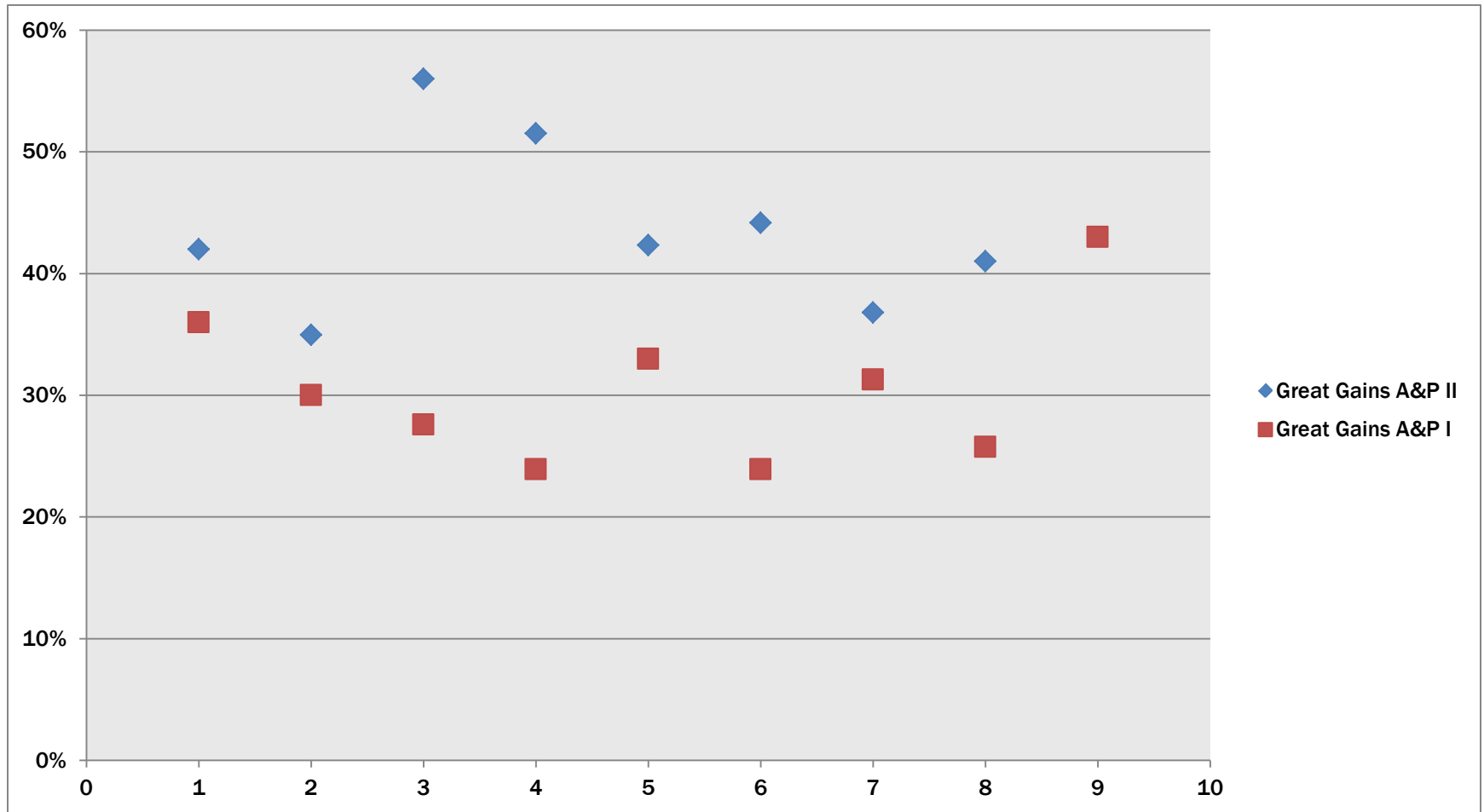
Mean Values



“Understanding” Domain on the Post-survey Mean Values



“Understanding” Domain on the Post-survey Percentages for “Great Gains”



Student Responses to Open-Ended Questions

Please comment on the CE component of the course. Was it useful? How did it affect the *understanding* of the material presented in the course?

- I really liked how *we got to choose a topic* that we have interest in and be able to connect the dots to the reading requirements.
- It was useful and helped me understand how certain things had an *effect on the body*. However, it was sometimes difficult to find a chart/graph related to the subject.
- Yes it was useful for helping us *think outside the box* and not just memorizing a text book.
- Yes it was useful it helped me to *understand the biology* aspects of the course.
- Yes the CE was useful. It helped you put what can seem to be a *complex material* into real world situations and *make sense* to the individual.
- The CE gives me a chance *to apply* what was taught in class to a real life situation.
- For me it started out as just an assignment but then i *became extremely interested* in it. I understand more about the concepts I delved into as well as *how everything in our body is connected* somehow.
- I enjoyed the civic engagement project not only because of the information i learned on my own but as well as what *my classmates have taught me*
- It gave a nice *change of pace* to the usual test only way the class is run
- It helped me understand more *about my own body*
- It made me *aware of the health issues* and the connections between the class and the CE component.

Student Responses to Open-Ended Questions

Would you recommend students to take courses with the CE component? Why?

- It helps you *to understand the course material* and know how health issues effect people in daily life.
- Yes and no. Yes, if they need *to improve their understanding* of the subject, but no if they're busy and aren't willing students.
- Yes I believe it will *expand their minds* and interest them more in learning.
- Yes. Its *applying* real life information
- Yes, you *can research* and better understand any topic you are interested in.
- Yes I would, it is an eye opener, you *come face to face with reality*.
- Yes. Although it is a little bit of extra work throughout the course it is really helpful for *long term memory* on the different aspects throughout the course.
- Allows you to *enjoy yourself* and study something you care about
- You get to learn more about *important issues*.
- I will highly recommend it because it is a very useful *tool for study*
- Yes, it invites *your own insights* into the topic
- Because we needed to tie our issue to so many organ systems helped me understand the *whole body* more in depth.
- It will *show why* you are learning something instead of just learning it to pass a class.

Student Responses to Open-Ended Questions

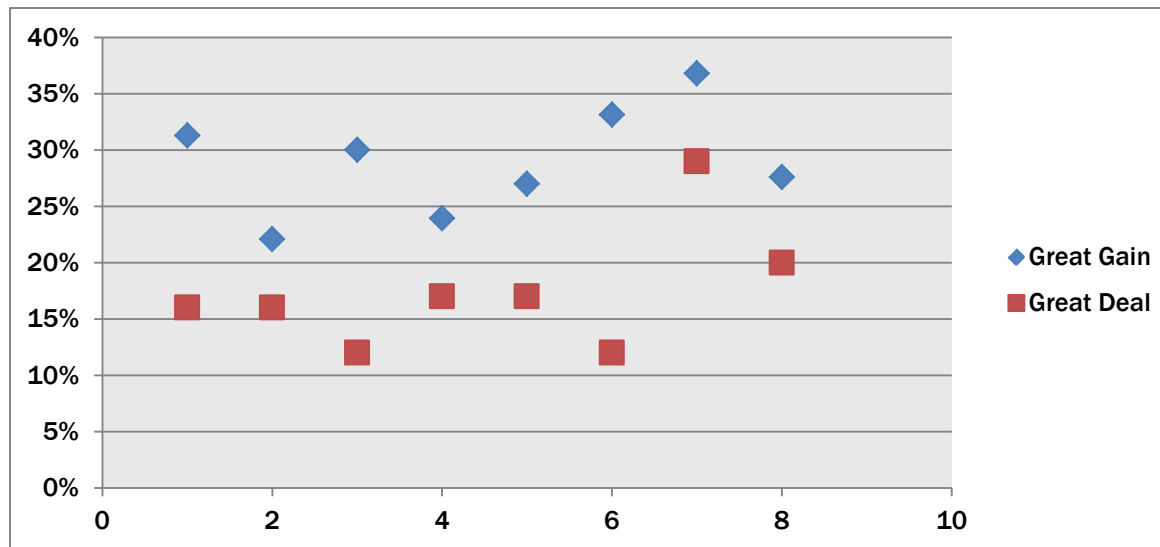
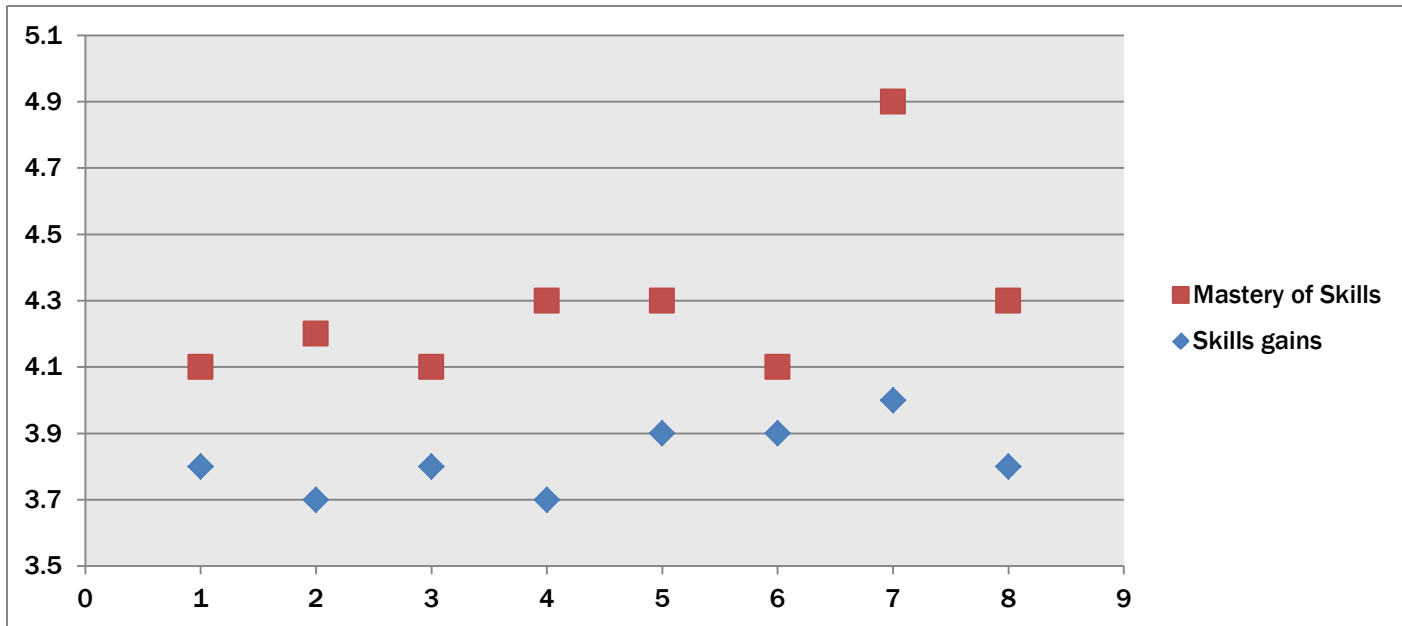
Do you think working on the CE assignments helps to remember course content better? why?

- Yes because we had the advantage *to choose our own social issue* that we can relate to, it is done with our own interest.
- Yes. When you *do research*, you memorize material better.
- Yes! Because by doing *research*, I automatically study for the course.
- Yes because now you have the teachers' point of view and *research* your own
- Yes, because you're constantly researching topics further and using your *own ideas* to connect to the subject.
- Yes because it made me look back at information on physiology to see how *everything ties together*.
- Yes I do, because having *a different approach or learning strategy* can never harm anyone. I learned facts through gathering research and making my own assumptions or rather *interpretations*.
- No, I don't think the CE assignments helped me remember the course content at all. It *took away from studying* to do research.
- Yes I do. I believe so because people tend to remember things that become personal and that's what CE does. It makes the *material applicable to your life*
- Yes because when you *connect* something to a real life situation its easier than memorizing from a book.
- *Connections* to real life situations makes understanding the material easier than rote memorization.
- Memorizing will only get you so far so you need to really know what you are talking about and when. You do the civic engagements you get to *understand* the system Yeah you chose better.
- Yes, because it really *motivating* student to search and increase their knowledge

“Skills” Domain

	1:not applic able	2:not at all	3:just a little	4:som ewhat	5:a lot	6:a great deal	Mean	1:no gains	2:a little gain	3:mod erate gain	4:good gain	5:great gain	9:not applic able	Mean
1 Find articles relevant to a particular problem in professional journals or elsewhere	3%	7%	25%	26%	24%	16%	4.1	0%	15%	21%	33%	31%	0%	3.8
2 Critically read articles about issues raised in class	3%	4%	20%	29%	29%	16%	4.2	2%	13%	19%	40%	22%	4%	3.7
3 Identify patterns in data	1%	8%	13%	45%	21%	12%	4.1	2%	11%	20%	35%	30%	2%	3.8
4 Recognize a sound argument and appropriate use of evidence	1%	4%	16%	38%	24%	17%	4.3	6%	8%	24%	39%	24%	0%	3.7
5 Develop a logical argument	1%	4%	17%	34%	26%	17%	4.3	0%	14%	13%	44%	27%	2%	3.9
6 Write documents in discipline-appropriate style and format	4%	4%	16%	43%	21%	12%	4.1	2%	8%	20%	35%	33%	2%	3.9
7 Work effectively with others	0%	1%	5%	22%	42%	29%	4.9	2%	8%	20%	33%	37%	0%	4.0
8 Prepare and give oral presentations	4%	5%	17%	29%	25%	20%	4.3	2%	9%	28%	34%	28%	0%	3.8

“Skills” Domain: Baseline and Post-Survey



Student Responses to Open-Ended Questions

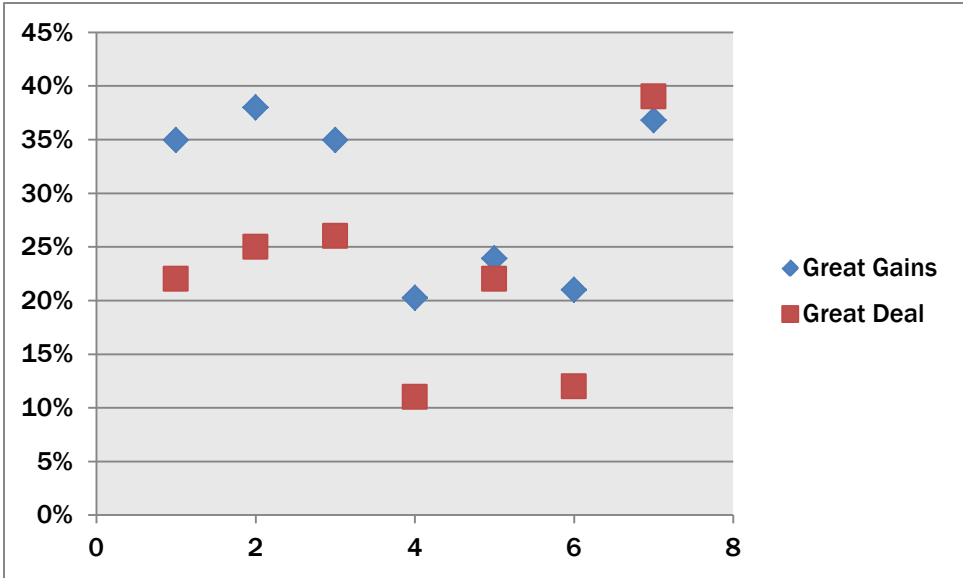
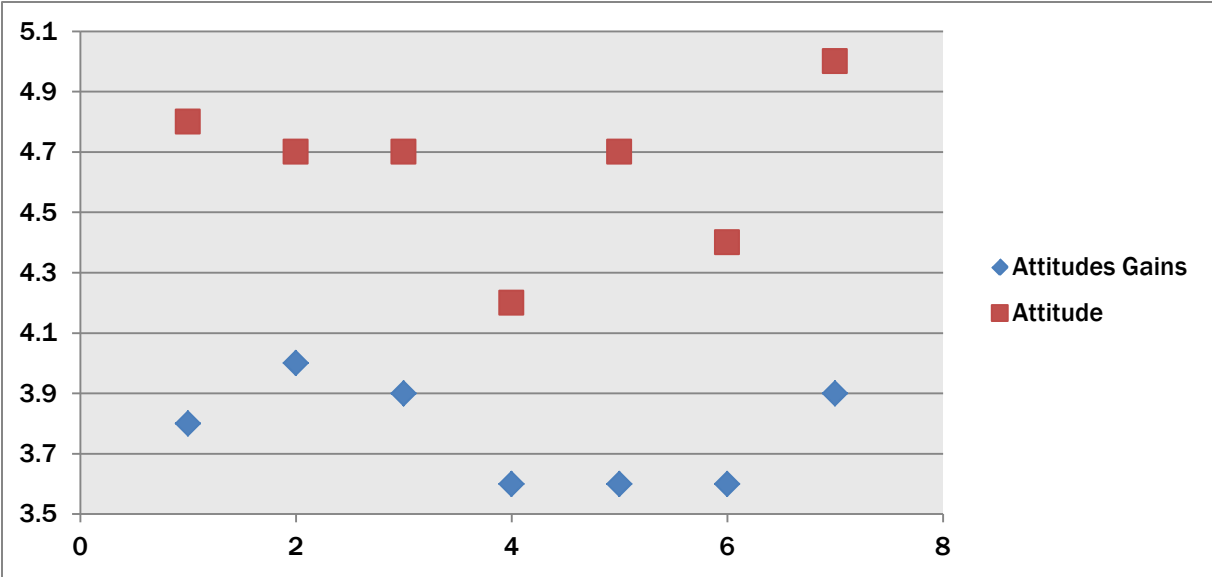
Please comment on what SKILLS you have gained as a result of this class:

- Critical reasoning, oral presentation, logical thinking
- I learned how to *write* more efficiently and how to *think* more efficiently as well.
- The skill to think of the *whole picture* instead of just 1 thing.
- Better *study habit* and time management
- My *research skills* have improved from this class
- *Attention to detail*
- I am better able to *explain to someone* how systems of the body work.
- I am more confident about *explaining to others* daily things, like food, that can harm their body
- I have gained the skill of looking up *research* for the systems in our body and how to *give oral presentations* of the information we learned about.
- I gained working well with a *big group* and how to search for related articles on the internet about my topic.
- I gained strength to *speak openly*.

“Attitudes” Domain

	1:not applic able	2:not at all	3:just a little	4:som ewhat	5:a lot	6:a great deal	Mean gains	2:a little gain	3:mod erate gain	4:goo d gain	5:gre at gain	9:not applic able	Mean	
1 Enthusiastic about the subject	0%	1%	8%	22%	46%	22%	4.8	7%	6%	19%	33%	35%	0%	3.8
2 Interested in discussing the subject area with friends or family	0%	4%	8%	25%	38%	25%	4.7	4%	7%	15%	37%	38%	0%	4.0
3 Interested in taking or planning to take additional classes in this subject	1%	3%	11%	22%	37%	26%	4.7	6%	7%	18%	35%	35%	0%	3.9
4 Confident that I understand the subject	0%	3%	14%	53%	20%	11%	4.2	4%	9%	32%	35%	20%	0%	3.6
5 Confident that I can do this subject	0%	1%	8%	29%	39%	22%	4.7	6%	10%	28%	33%	24%	0%	3.6
6 Comfortable working with complex ideas	0%	4%	13%	37%	34%	12%	4.4	4%	11%	26%	39%	21%	0%	3.6
7 Willing to seek help from others (teacher, peers, TA) when working on academic problems	0%	0%	8%	24%	29%	39%	5.0	2%	9%	21%	31%	37%	0%	3.9

“Attitudes” Domain: Baseline and Post-Survey



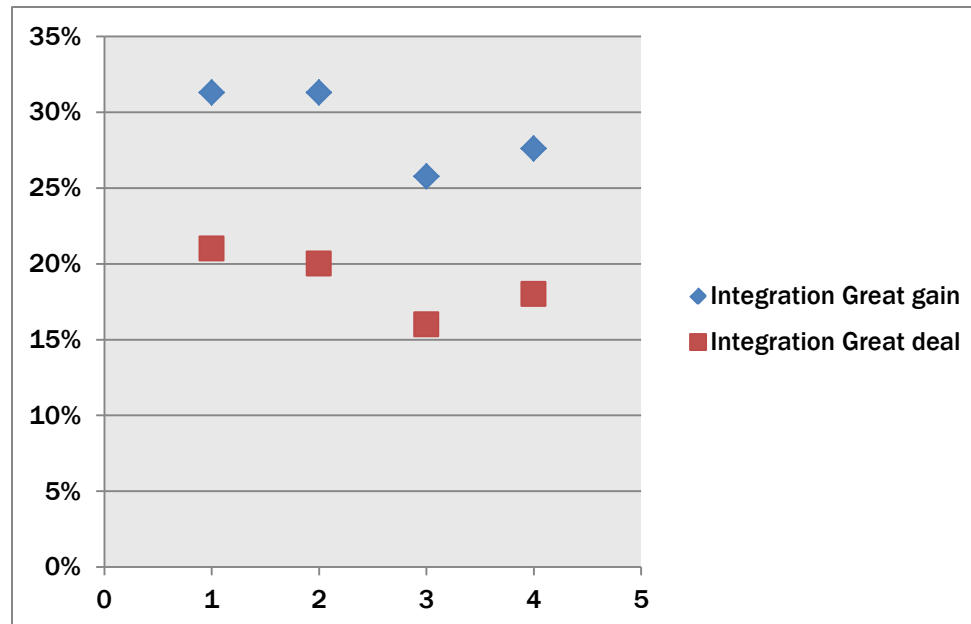
Student Responses to Open-Ended Questions

Please comment on how this class has CHANGED YOUR ATTITUDES toward this subject:

- This class made me realize that the *human body as a whole* is an extremely complex system.
- I am *no longer afraid* of taking science courses
- I understand now how much *nutrition* plays a role in the proper function of organs and systems
- My attitude changed, because if you don't understand one part you will become lost. so *paying attention* really matters.
- My understanding of the material has made me *more confident* in the subject.
- I am more *careful with my body*, especially concerning food intake
- I have become more used to the idea of *opening up my mind* about learning a subject that's more complex such as is Bio 12.
- It made me a lot *more comfortable* in continuing in the Bio world
- I was first intimidated by the workload, but it all came together towards the end to contribute to a *better understanding* of the topics.
- It has made me *more passionate* and certain about my future career
- *I need to learn more*

“Integration” Domain: Baseline and Post-Survey

	1:not applic able	2:not a t all	3:just little	4:some what	5:a lot	6:a great deal	Mean gains	1:no gain	2:a little gain	3:mod erate gain	4:goo d gain	5:gree t gain	9:not applic able	Mean
4. Presently, I am in the habit of...														
4.1 Connecting key ideas I learn in my classes with other knowledge	0%	0%	5%	32%	42%	21%	4.8	0%	6%	18%	44%	31%	0%	4.0
4.2 Applying what I learn in classes to other situations	0%	0%	8%	18%	54%	20%	4.9	0%	4%	18%	46%	31%	2%	4.1
4.3 Using systematic reasoning in my approach to problems	1%	1%	7%	36%	39%	16%	4.6	2%	9%	20%	42%	26%	0%	3.8
4.4 Using a critical approach to analyzing data and arguments in my daily life	0%	1%	16%	34%	30%	18%	4.5	4%	6%	20%	42%	28%	0%	3.9



Conclusions

- **Students contextualized physiology concepts of A&P II**
 - research
 - interpretation
 - personalization
- **Students demonstrated understanding of functional relationship between organ system**
 - connectedness/continuity
- **Students reported usefulness of integration of CE assignments into A&P II courses:**
 - learning
 - relevance
 - retention

Future Directions

- **Student-driven inquiry into the meaningfulness of CE component:**
 - Expectations
 - Outcomes
- 1. Focus groups facilitated by student-researchers
- 2. Development of a survey
- 3. Administration of the survey and data analysis

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