

2016 High School Honors Human Anatomy and Physiology Curriculum Investigation for College Board Advanced Placement Classification Validity

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ABSTRACT

Four sections of senior Honors Human Anatomy and Physiology (A&P) students are representative of sixty-five nations. These classes participated in a yearlong investigation pursuant of innovative learning, and grading modalities to introduce a 21st century curriculum for A&P to become a College Board Advanced Placement (AP) course. All enrollees began the year by taking a self-assessment based on Howard Gardner's Multiple Intelligences. This data was evaluated for the design of learning approaches identifying student uniqueness that could better implement the Next Generation Science Standards (NGSS), and present State of Tennessee Human Anatomy and Physiology Learning Standards laying the groundwork to write the AP curriculum. Component curriculum rubrics were used, and modified to enable students to self-evaluate their performance in certain areas. Students participated in teams represented as Center for Disease Control and Prevention (CDC) 'Intern Teams' investigating various diseases. The students, also, researched health equity, and disparity issues from variables based on survey questions they designed that could affect the health care treatment of patients suffering from their investigated disease. They then proposed a 2016 CDC Educational Campaign revamping public health education for the disease, including brochure, and public service announcement (PSA).

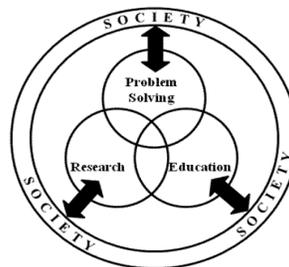
1. INTRODUCTION

Teaching every grade, Kindergarten through 12th, and having the privilege of giving classes in undergraduate and graduate school courses has provided a perspective on students' extraordinary capabilities. On some levels academic prowess is sometimes underestimated, and thus, students feel undervalued in often, overlooked, skill sets. There is, certainly, substantiated data regarding low performance in essential academic tenets; and these without question are primary basics, and preliminary requisites for future educational endeavors. There is no challenge to these findings, but only agreement to the foundations they have provided. This investigation is meant to shed a bit more light on students' innate capabilities through the use of the Gardner model. It is seen, as key, to opening horizons for the possibility of A&P to be re-categorized as an AP course option, providing a beneficial foundational choice for those planning on choosing an educational pathway affecting, and impacting health care, and the disparity and equity issues of the 21st Century.

2. RECOGNITION OF THE OPPORTUNITY

The first glimpse of 'more' for A&P unfolded when 30 lbs. of free cow hearts were ordered from a Green Bay meat packing company a few years ago, but 300 were delivered, and given to other A&P classes. At the same time our school hosted, and shared the dissection with visiting nurses from Japan. The tone was gracious, polite, and filled with quiet, but excited giggles from our guests; and us, as the very large specimens for the Cardiovascular System Lab were opened. These few minutes gave way to a 'cultural concurrence.' One may not be able to 'see' a transaction of this nature, but when an opportunity like this presents itself; one must leverage the momentum, when experience merits it. So it was with this, we were privy. Seeing students as engaged, and enthusiastic as these professionals opened up the possibility of 'more' for A&P.

3. THE MODEL and ELI COHEN



The context, and purpose of this presentation is based on the above model, and [1] Dr. Eli Cohen's seminal writings in 1999, "Reconceptualizing Information Systems as a Field of the Discipline Informing Science: From Ugly Duckling to Swan," *Journal of Computing and Information Technology*, and re-published in [2] T. Grandon Gill and Eli Cohen's, 2009, *Foundation of Informing Science*."

The further models that have been developed, as well, as attending this 'Special Track on Integrating Research, Education, and Problem Solving: IREPS 2016' are the rationale behind writing this paper. 21st century students can be better rooted in health care preparatory course work through an AP A&P course option. Their inherent capabilities reverberate with future possibilities.

4. SELF-ASSESSMENT

At the beginning of the school year students were asked to take a self-assessment based on Howard Gardner’s Multiple Intelligences using an online self-assessment instrument developed by Dr. Terry Armstrong. 82 of the 110, originally, enrolled as MLK A&P students handed their Multiple Intelligence Assessment in by a certain date and time for basic data compilation. The goal was to launch an investigative year, using the student self-evaluated, multiple intelligence information to implement lesson strategies and designs approaching student uniqueness by their own self-evaluations. Some lessons were more successful than others, but all were based on present State of Tennessee learning objectives and standards, laying the groundwork to write a possible AP A&P curriculum. Please, note other data was taken into consideration on past student performance and capabilities in math, science, and English. Other science aptitudes, using data reviewed by their instructors in AP Biology, AP Chemistry, and AP Physics along with the NGSS and State of Tennessee end of course tests in Biology and Chemistry were examined. Having comprehensive data of this caliber was indispensable in bringing about an initiating year. It is important to, also, note the necessity of the social and emotional learning paradigm, as a vital component in embarking on this potential AP A&P course choice. A sensitive educator is paramount at any point. However, with an investigation of this nature, it is key in successful laboratory and classroom dynamics. Exhibiting genuine honor, respect, and a smile towards a student is “fundamental.” In a, mutually, satisfying educational exchange, student curricular consumers are able to discern good practice, whose outcome is beneficial to their educational well-being, and overall experience. They indicate reception by an open learning attitude, and a smile back. Students are most receptive when their best interests are evidenced in an information flow that is positive. This influences every aspect of academic presence, bringing back dividends manifested in students giving their best.

5. 1st DATA SET

MLK’s Four Classes of Honors Human Anatomy and Physiology Basic Analysis of Multiple Intelligences

Engaging Intelligences	Language	Spatial	Logic/Math	Body Movement
Totals	233.24 /395	242.69 /395	232.91 /395	291.78 /395
Percentages	59.04%	61.44 %	58.96%	73.87%

Musical	Social	Self	Nature
274.62 /395	315.3 /395	302.24 /395	252.03 /395
69.52%	79.83 %	76.52%	63.81%

The potential of a 21st Century A&P AP curriculum is rooted, first and foremost, in reaching students based on their innate intelligences to better serve them, and their curricular consumer needs.

"Where the world ceases to be the scene of our personal hopes and wishes, where we face it as free beings admiring, asking and observing, there we enter the realm of Art and Science."

Albert Einstein

“Inner Einstein” became a part of the vernacular understanding resonating with students after taking the assessment based on Gardner’s Multiple Intelligences Theory. The phrase, “Inner Einstein” in a simple way, embodies what was perceived from their self-assessment, their ‘in-sight,’ ... translated into ‘I-sight,’ their actual data implemented into lessons they took ownership of as intellectual stakeholders.

6. PHILOSOPHICAL INTENT and DESIGN

Alluding to this earlier, as to AP reclassification potential is: Many times students know more than they think they do. The main rubric on a ‘Skull Project’ was developed over a period of five years from student feedback. The CDC Project Rubric was modified, adapted, and implemented from an online university course. It is similar to the Cornell College Poster Assessment format, (<http://www.cornellcollege.edu/library/faculty/focusing-on-assignments/toolsfor-assessment/poster-presentation-rubric.shtml>). This was an excellent tool in providing self-examination perimeters for university rigor for a student to achieve an, ‘A,’ or ‘Advanced’ status. Self-evaluation, and the quality level required is both challenging, and humbling. Students were given self-evaluation opportunities for certain labs, dissections, projects, and writing. Depending on the lab type, they could collaborate with a team, or present solo in a type of oral defense. However, the self-determining ability to collaborate with their team members, and then the teacher is empowering. If presenting solo, they and the teacher assessed the assignment together, collaborating on their final grade. The use of rubrics is appreciated by students, as is the mutual respect afforded through grade collaboration. These tools are useful, not only in the evaluation of a body of work for a “grade,” but are pertinent in developing, and guiding student ‘professionalism.’

The four highest intelligences of Social, Self, Body Movement, and Music were used as, frequently, as possible; but not to the exclusion of Nature, Language, Logic/Math, and Spatial. All eight of Gardner’s Multiple Intelligences were explored, as a means of ‘capability focus’ criteria, and course objective. Lessons based on Gardner are not new, nor is there pretense to have sparked any reinvention of a good thing in this discourse. This year was intended to bring the “inner Einstein” ‘capability focus’ into a disciplined, academic, instrumentation model by using rudimentary data results to unfold the next step in the directing of A&P becoming an AP course option. The bottom line, always, is to see students engaged in a greater understanding of the A&P curriculum.

7. COURSE OVERVIEW

First semester was spent in Biology, Chemistry and some Physics review pertaining to content, following the NGSS, and the State of Tennessee standards. Tissue type study led to body systems’ analysis, inclusive of a Skull Project, grasshopper, and bullfrog dissections. Second semester was the study of further systems enhanced, and reinforced by various labs. Sheep brain,

eye, and heart dissections were culminated with the cat dissection. Gardner's Multiple Intelligences remained the anchoring point in all activities, and labs, so as the intent regarding 'capability focus' was consistent. Labs were frequent, sometimes three and four times a week during the last nine weeks, using Martin's, college level, Lab Manual; as the source text. Other labs, and hands on activities augmented. This 2015–2016 investigation was purposed to see student curricular needs better served in A&P with a potential AP option. There is urgency before us with health disparity, and equity issues looming large. Educating with excellence in a shared vision, captivating students to be the creative, solution catalysts of tomorrow is the goal, and a call.

8. CENTER for DISEASE CONTROL and PREVENTION, CDC, INTERN TEAMS

In the Center for Disease Control and Prevention, CDC, Intern Team Project, the students studied health equity, and disparity issues introduced by Dr. Cynthia A. Gómez, Health Equity Institute's Director at San Francisco State University through <http://healthequity.sfsu.edu>, and further at <http://www.healthypeople.gov/2020/about/foundation-health-measures/Disparities#top>. YouTube videos of TED broadcasts were, also, a source of information on the Health Equity and Disparity topic. The scenario was set first by students' self-selection into three-member CDC Intern teams of college graduate age. They are hired to investigate health disparity, and equity issues, as it relates to a disease educational campaign, and the redesign a 2016 national or regional educational campaign on their disease. The campaign is to include a new PSA, and revamp the CDC brochure placed in clinics. The disease brochure is to be based on their new PSA format, as a tandem, associative tool, updating current public education.

Each team in every class authored five survey question possibilities, representing current health disparity, and equity issues. The A&P students took the survey. Downloaded generic 'Smiley Faces' were used, as a part of instrumentation format, but were not authored by anyone associated with MLK. Once the surveys were taken, rudimentary data was gathered.

CDC Project Portfolio Contents

1. Abstract;
2. Rubric;
3. Project calendar;
4. Portfolio Contents Outline;
5. Relevant information and concepts checklist;
6. CDC PSA Script and general plan outlined;
7. PSA on thumb drive or attached;
8. Brochure: 1. Pencil, 2. Gray scale draft, 3. Color final;
9. Questionnaire;
10. Disease research plan;
11. Disease data and graphs;
12. Survey data and analysis, inclusive of graphs;
13. Communication of data results;
14. Reflections; and
15. Conclusion.

A Girl Scouts of America two-minute video provided the portfolio
<https://www.youtube.com/watch?v=eywBa0xfQFw> Girl Scouts

PSA

framework to build presentations. It served to provide the outline for worksheets used by students. These were a helpful organizational basis of their completed disease investigation. Khalid A., George M., and James S. developed a downloadable 'App' for their presentation, as well.

CDC Intern groupings facilitate problem-solving teams. Students are able to 'hash out' differences on team portfolio/presentations. In joint-evaluations it was found when students break away, and return for teacher input and collaboration; they are, generally, quite honest in their self-analysis. An opportunity to discuss, and present rationale for a team grade with a collaborative follow-up from the teacher evokes accountability, elicits honesty, and sets a professional student tone. Participants are, usually, far stricter on themselves, knowing every nuance of performance.

9. 2nd DATA SET

On the last day of class students were asked to complete an End of Year Course Survey on satisfaction. Results are on the following charts based on the simple averages of participants. Afterwards, it was noted, 'Course should be AP,' could have meant to the exclusion of a regular course option offered.

+1Strongly Disagree-5: Strongly Agree	+1Strongly Disagree-5: Strongly Agree	1:Very Dissatisfy 5::Very Satisfied	+	+
Recommend course	Recommend teacher	Rate your satisfaction on course:	Apropos course objectives	Provide higher learning
288	276		279	265
Average response: 4.43	Average response: 4.25		Ave response: 4.29	Ave response: 4.08

+	+	+		-
Course text	Course signif	Edu goals fwd	Web Site	Not enough assignments
231	271	263	250	-20
Ave response: 3.55	Ave response: 4.17	Ave response: 4.08	Ave response: 3.84	Ave response: -0.31

+1Strongly Disagree-5: Strongly Agree	+	+	-	-
	Course is challenge	Course should be AP.	Workload too great.	Not enough assigned
	2	204	39	-20
	Ave response: 3.62	Ave response: 3.14	Ave response: 0.06	Ave response: -0.31

10. CONCLUSION

In 2016–2017 further course adjustments will be made.

11. REFERENCES

- [1] E. Cohen, “Reconceptualizing Information Systems as a Field of the Discipline Informing Science: From Ugly Duckling to Swan”, *Journal of Computing and Information Technology*, 1999.
- [2] T. Grandon Gill, Eli Cohen, “Reconceptualizing Information Systems as a Field of the Discipline Informing Science: From Ugly Duckling to Swan”, *Foundation of Informing Science*, 2009.