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Assessment of Motivation in Human Anatomy and Physiology Students

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Assessment of Motivation in Human Anatomy and Physiology Students

By:

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A thesis submitted to the faculty at the University of Mississippi in partial fulfillment of the requirements of the Sally McDonnell Barksdale Honors College.

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ABSTRACT

Mary Claire Whitehead: Assessment of Motivation in Human Anatomy and Physiology Students

(Under the direction of Dr. Carol Britson)

Motivation is the key to success in difficult science courses such as Human Anatomy and Physiology. Students may possess intrinsic motivation, or motivation for enjoyment, extrinsic motivation, or motivation for a reward, or amotivation, a lack of motivation at all. The goal of this experiment was to identify better ways of helping students succeed in Human Anatomy and Physiology (HAP) at the University of Mississippi, determine when motivational efforts seem to decrease during the semester, and identify how to better develop intrinsic motivation in students. There was a significant relationship between many of the student's survey responses to their exam scores and earned grade for the course. Many students whose survey responses leaned toward motivational habits also tended to perform better in the course. Most students responded that they were taking the course as a requirement for their major and not for the enjoyment of learning the material, making students less intrinsically motivated to do well. On all surveys, students who responded that they would work as hard as possible to make a good grade scored well on exams administered during the same timeframe as when the survey was given. The data also showed that even if students didn't enjoy the material, they would still work hard to perform well in the course. The significant relationships tended to lean towards responses that correlated with a motivated student. However, the mean responses per question did decline as the semester continued. Students seemed to answer much more positively at the beginning of the semester than the end, showing a decrease in their motivations to do well. This could be due to feeling

overwhelmed or discouraged by the amount of information, the difficulty of information, or poor exam scores.

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INTRODUCTION

Human Anatomy and Physiology (HAP) can be a difficult and daunting course for college students and has a high D, F, or withdrawal rate (Sturges et al. 2016). This could be due to complicated, specific amounts of information to learn and understand, or the pressure to succeed in order to continue with a student's major and career goal (Meguid et al. 2019). HAP requires memorization of organs, tissues, and body functions and learning and understanding intricate details about the human body. Studies suggest that learning outcomes in anatomy education are not covered heavily enough, thus increasing the burden of students to participate in self-directed learning in order to cover topics (Meguid et al. 2019). This could be attributed to the fact that there are so many topics to cover, making it hard to spend large amounts of time on any particular learning outcome. Up to 50% of students enrolled in HAP courses fail to earn at least a C, and must either retake the course, change their major, or drop out (Maurer et al. 2013). Thus, succeeding in a HAP course requires, in part, motivation, and this provided an opportunity to explore students' motivational efforts and how they impact academic habits and performance.

Deci and Ryan's (1985) self-determination theory (SDT) does not define motivation as a unitary concept (Maurer et al. 2013), yet it divides motivation into three types: intrinsic motivation (IM), extrinsic motivation (EM), and amotivation (AM). IM is the "most self-determined type of motivation, in which activities are accomplished for the sake of enjoyment" (Sturges et al. 2016). IM can further be divided into three subscales: IM to know, IM toward accomplishments, and IM to experience simulation (Vallerand et al. 1992). IM to know is when an individual experiences fulfillment when learning or understanding something new. IM toward accomplishments "occurs when an individual

engages in a behavior for the pleasure experienced while trying to accomplish a task or create something." IM to experience stimulation occurs when an individual participates in something to allow "stimulating or exciting sensations" (Vallerand et al. 1992). IM is not motivated by any type of reward, just for the success of learning and enjoyment.

EM is when a behavior is driven by a reward or incentive beyond the actual undertaking. EM is further divided into three subscales: EM identified, EM introjected, and EM external (Sturges et al. 2016). EM identified occurs when someone truly appreciates the undertaking, though they do not enjoy doing it. EM introjected occurs when someone only participates in the undertaking "to maintain personal expectations or avoid guilt." EM external occurs when someone only participates in an undertaking "solely as a means to obtain an external reward or avoid punishment" (Sturges et al. 2016). The rewards involved in EM pertaining to HAP may be a good grade in the course or on an exam, entry into professional school, etc. AM is at the opposite end of the self-determination theory from being intrinsically motivated, where motivation is lacking completely.

Studies show that students are shifting from an intrinsic to extrinsic motivational approach in HAP courses (Sturges et al. 2016) and that "instructors can influence students' motivation on the extrinsic motivation subscales through an attendance policy, in-class assignments and other activities, but have little control over a students' intrinsic motivation" (Maurer et al. 2013). However, "students whose motivations are more intrinsic do better in school, have lower rates of withdrawal, absenteeism, and dropout, and have lower feelings of anxiety about school with higher levels of academic performance" (Sturges et al. 2016). A study by Griffin et al. (2013) showed that the

leading factor in advancement of overall academic performance is students' level of intrinsic motivation. Botnaru et al. (2021) further researched the link between academic motivation and performance in undergraduates enrolled in general chemistry, organic chemistry, and anatomy and physiology. Their results suggest that students in lower-level STEM courses report relatively high levels of motivation that remained stable over time. However, there still exists a lack of research on motivation in entry-level STEM courses, thus encouraging this study on determining a way to increase the intrinsic motivations of students in HAP.

HAP is an introductory course taken by many students with a science or pre-health major. This study focuses on students enrolled in Human Anatomy and Physiology at the University of Mississippi. Elements of study in the course include cells, tissues, and the integumentary, skeletal, muscular, and nervous systems within the human body. Labs are associated with each lecture to give students the opportunity to be hands-on with the information they are learning in the class. HAP is a requirement for many science majors and a pre-requisite for many professional schools, so the majority of students enrolled in the course have a pre-health major and are interested in a future in the healthcare field.

Based on the above information and surveys conducted throughout the fall semester of 2021, we hope to use our data to identify better ways of helping students succeed in HAP. We want to determine when motivational efforts seem to decrease during the semester and identify how to better develop intrinsic motivation in students. As previously stated, many of the students enrolled in HAP have plans to attend a health-related professional school post-graduation, so identifying a way to increase their

intrinsic motivation will also help them in their future endeavors. We will also address whether demographics play a role in motivation, including their race, gender, year in school, and/or cultural background. We hypothesize that students' motivational efforts will correlate with their final class scores, that increased motivation leads to higher grades, and that increased participation and class attendance leads to academic success.

METHODS

Students enrolled in Human Anatomy and Physiology I (BISC 206) at the University of Mississippi were recruited to participate in this study. BISC 206 is the first semester course of a two-semester sequence and is only offered in the fall semesters. Topics covered during the first semester include physiology of cells, tissues, and the integumentary, skeletal, muscular, and nervous systems within the human body. There is one lecture section that meets three times a week for 50 minutes per session. There are ten laboratory sections that meet once a week for two hours. 276 students were enrolled in Human Anatomy and Physiology I in Fall 2021. This protocol was approved as Exempt under 45 CFR 46.101(b) (#2) by the University of Mississippi Institutional Review Board (Protocol #21x-262).

A total of three, optional surveys were administered to students enrolled in BISC 206 throughout the fall semester. Each survey was conducted during the students' laboratory session and took 10-15 minutes to complete. Each student who completed a survey was required to sign a consent form to grant access to survey responses and de-identified final course scores. The participants sat in the same seat every lab session and recorded their seat number to link their survey response data to their final course score. The survey questions asked participants to respond to each statement on a scale from "strongly disagree" to "strongly agree." Specific dates to administer the surveys were chosen to assess motivational thoughts and efforts at the beginning of the semester, halfway through the semester, and finishing up the course at the end of the semester. The first survey (Appendix A) was conducted during the week of August 31-September 2, which was the second week of the start of classes. Survey 1 contained optional

demographic questions, which included age, sex, year in school, GPA, cultural background, and major. Questions asked were specific to the BISC 206 course and assessed students' thoughts and goals for their academic performance throughout the semester. The second survey (Appendix B) was conducted during the week of September 28-30, which was around the same time that midterm exams were being administered in all courses. Survey 2 was a standardized survey with questions adapted from the Motivated Strategies for Learning Questionnaire (Pintrich et al. 1990). The third survey (Appendix C) was conducted during the week of November 16-18, which was the week before the Thanksgiving holidays and three weeks before final examinations. Survey 3 included questions similar to survey 1 but evaluated students' thoughts towards their course performance having almost completed the course.

Descriptive statistics were obtained for all exam and lab practical scores as well as survey responses. Survey responses were given numerical values on a scale of 1-5. Pearson correlation tests were calculated for each pair wise comparison of survey responses, exam scores, and lab practical scores. The level of significance was set at $\alpha = 0.05$. All statistical tests were conducted using SPSSV27 software that is licensed to the University of Mississippi.

RESULTS

Out of the 276 students enrolled in the course, 264 students completed the first survey, 263 students completed the second survey, and 224 students completed the third survey. Demographic information was asked only on survey 1, and students were given the option to share their age, sex, year in school, GPA, cultural background, and major. Survey 1 was completed by 217 students. Of those, 159 shared their gender, with 85.5% being female and 14.5% being male. 165 students shared their year in school, with 3.6% first years, 52.1% second years, 30.9% third years, 12.1% fourth years, and 1.2% fifth years. 14 students shared that they were first-generation college students. 28 students shared that they were ethnic majorities, 12 students shared that they were ethnic minorities, and 6 students shared that they were gender minorities. 125 students provided their college majors, with the majority including exercise science, allied health studies, and dietetics and nutrition (Fig. 1). The only demographic information that was correlated to performance was year in school, which was negatively correlated with the final earned course score ($r= -0.199$, $p < 0.05$, $N= 149$). Second- and third-year students tended to score higher than other ages (Fig. 2). Mean exam scores and earned course scores for students who participated in the surveys are shown in Table 1. The earned course score considers 2 lab practical scores and extra credit points, which may explain the increase in score.

Survey 1 consisted of 10 questions that were Anatomy and Physiology focused and aimed to evaluate student motivation at the start of the course and before the first exam. Students could respond to each question on a scale from 1-5, 1 being “strongly disagree”, 2 being “disagree”, 3 being “neutral”, 4 being “agree”, and 5 being “strongly

agree." When the data were analyzed, a large number of responses showed statistically significant correlations with exam scores. Questions 1, 2, and 6 showed a positive correlation to exam 1 scores, which was taken two weeks after the first survey was administered, and question 4 showed a negative correlation to exam 1 scores (Table 2). There was a positive correlation shown in questions 3 and 4 and final course score. Question 4 stated "I am only taking this course because it is required for my major/post-college career." There was strong significance found in this question relative to year in school ($r= 0.314$, $p < 0.01$, $N= 178$). Question 8 stated "it is important to me that I learn and understand the material I am being taught in class" which showed a strong positive correlation to question 6 that stated, "I will work hard to get a good grade even if I do not enjoy the material being taught" ($r= 0.436$, $p < 0.01$, $N= 209$). Question 4 stated "I am only taking this course because it is required for my major/post-college career" which received a mean score of 3.4120, and question 10 stated "I am taking this class for the pleasure that I experience in broadening my knowledge about subjects which appeal to me" which received a mean score of 3.6601. Responses to these questions showed a negative correlation ($r= -0.308$, $p < 0.01$, $N= 202$).

Survey 2 consisted of 10 questions that were standard to the Motivated Strategies for Learning Questionnaire (Pintrich et al. 1990). It was administered in between exams 1 and 2 and before the first lab practical. Of the 10 questions, questions 1, 3, 8, and 10 showed a positive correlation to exam 2 scores and questions 2 and 6 showed a negative correlation to exam 2 scores, which was taken the week after the second survey was administered (Table 4). There was a strong positive correlation between questions 1, 2, 3, 4, 5, 7, 8, and 10 and final course score. Question 6 stated "This material is too difficult. I

do not feel motivated to study if I cannot understand" which showed a strong negative correlation ($r= -0.302$, $p < 0.01$, $N= 200$) to survey 1 question 2, "I will work hard to do well even if I do not enjoy the material being taught." However, question 6 showed a strong positive correlation ($r= 0.437$, $p < 0.01$, $N= 204$) to question 2, which stated "I do not really enjoy the material being taught, but I am still studying hard in order to do well in the class." Question 6 also showed a strong negative correlation ($r= -0.452$, $p < 0.01$, $N= 193$) to question 10, which stated "I am glad I am taking this class."

Survey 3 consisted of 10 questions that were Anatomy and Physiology focused and similar to questions asked in survey 1. It was administered to students one week after taking exam 4. Of the 10 questions, questions 1, 2, 5, 6, 8, 9, and 10 showed a significant positive correlation to exam 4 scores, and question 4 showed a significant negative correlation to exam 4 scores, which was taken the week before the third survey was administered (Table 6). There was a strong positive correlation between questions 1, 2, 5, 6, 7, 8, 9, and 10. There was a significant negative correlation ($r= -0.356$, $p < 0.01$, $N= 171$) between students earned final score in the course and question 4 which stated, "I wish that I had put more effort into this course." There was a significant positive correlation ($r= 0.399$, $p < 0.01$, $N= 157$) between question 8, "I enjoyed learning about A&P and feel confident in my knowledge of it" and survey 2 question 1, "I have made good grades in this class thus far." Students seemed to agree that they put enough effort into the course because of a strong negative correlation ($r= -0.506$, $p < 0.01$, $N= 167$) between questions 4 and 6, which stated, "I wish I had put more effort into this course" and "I worked as hard as I could to get a good grade in the course." The mean response for question 4 was 3.4211 and question 6 was 3.8323. There was a strong positive

correlation ($r= 0.535$, $p < 0.01$, $N= 149$) between question 10 and survey 2 question 10, which each determined if the student was glad they were taking/took the course.

Across all three surveys, the mean response per question often declined from survey 1 to survey 3 for identical questions. For example, question 1 of each survey gauged the student's confidence in their grade throughout the course. 3.977 was the mean response to this question for survey 1, 3.3824 for survey 2, and 3.3333 for survey 3 where 2 correlates to a response of "disagree", 3 correlates to "neutral", and 4 correlates to "agree" (Fig. 3). Question 2 across all surveys gauged the student's motivations to work hard in the course. 4.6912 was the mean response for survey 1, 2.8235 for survey 2, and 3.9474 for survey 3. Question 3 across all surveys asked if students were attending lecture and paying attention. 4.8009 was the mean response for survey 1, 4.2108 for survey 2, and 3.9181 for survey 3.

DISCUSSION

The goal of this study was to identify better ways of helping students succeed in Human Anatomy and Physiology at the University of Mississippi. We hoped to determine when motivational efforts seemed to decrease throughout the semester and identify how to better develop intrinsic motivation in students. We gathered demographic information to see if this played a role in motivation and hypothesized that students' motivational efforts would correlate with their final class scores, that increased motivation led to higher grades, and that increased participation and class attendance lead to academic success. To test these hypotheses and achieve our goals, three surveys were administered to students who chose to participate, and the data was examined.

The first survey was administered during the second week of school to get an idea of the level of motivation in students at the start of the semester. The data results showed that students' mean response to question 10, "I am taking this class for the pleasure that I experience in broadening my knowledge about subjects which appeal to me" was higher than students' mean response to question 4, "I am only taking this course because it is required for my major/post-college career." This suggests that students felt more intrinsically motivated at the beginning of the semester, wanting to succeed in the course for the enjoyment and not the reward. Students who reported higher scores on questions regarding working hard despite enjoying the material being taught also scored higher on exam 1, which was taken 2 weeks after survey 1 was completed. Students recorded an average answer of "agree" or "strongly agree" to 7/10 questions on survey 1, all pointing to a motivated student who planned to attend lecture, be an active learner, and dedicate time to succeeding throughout the course. However, question 1, "I think I will make a

good grade in this class" had an average score of 3.977. Even though students were reporting that they felt motivated to succeed and work hard in HAP, they still were less confident that they would do well in the course.

The second survey was administered right around the middle of the semester, and in between when students took their first and second exams. The data results showed that students were still motivated to work hard and succeed, but their mean responses were lower than on survey 1. For example, question 3 stated, "I have attended lecture and paid attention", which received a mean score of 4.2108. On survey 1, this question received a mean score of 4.8009. Attendance seemed to decline, and so did students desire to spend as much time as needed to understand the material. However, this average is not low enough to conclude that students had lost motivation. Students averaged a low score of 2.8235 on the statement, "I do not really enjoy the material being taught, but I am still studying hard in order to do well in the class," and a score of 2.5882 on the statement, "This material is too difficult. I do not feel motivated to study if I cannot understand." These results seem to counteract each other, as the first statement points to students not studying hard in order to do well, and the second statement points to students disagreeing that they do not feel motivated to study. Exam 2 average scores went down 8 points from exam 1 average scores (Table 1). All of these results show a decrease in intrinsic motivation from survey 1 at the start of the semester but still do not point to an overall attitude of amotivation in students.

The third survey was administered three weeks before the end of the semester, and after students had taken 4 exams. From exam 1 to exam 4, average test scores steadily decreased (Table 1). The mean response scores on the survey also decreased

from surveys 1 and 2. None of the statements on survey 3 received a mean score of 4 or higher. The statement, “I attended lectures and paid attention throughout” received an average score of 3.9181, which is lower than the scores on the first two surveys. This shows a decrease in student class participation and attendance. Students also were less likely to believe that they would make a good score in the course, with the average score for this statement being 3.3333. Student responses lead to the conclusion that they could have put more effort into the course and that they were neutral in their feelings about being glad they took HAP.

All of this data points to a decrease in motivation throughout the semester, as exam scores also decreased. Studies comparable to this one have found similar results. In a study by Young et al. 2018, motivation was surveyed across “41 foundational STEM courses at the beginning and end of each semester in an academic year at a small primarily undergraduate university.” They found significant pre- to post- semester declines in five measured motivational factors: intrinsic motivation, career motivation, self-determination, self-efficacy, and grade motivation (Young et al. 2018). A study by Zusho et al. 2003 investigated the levels of motivation in 458 students enrolled in introductory college chemistry classes. Overall, they found that “students’ levels of motivation decreased over time” and that “students’ judgements of their confidence to do well in the class decreased, and students were less likely to believe that chemistry was important or useful to them” (Zusho et al. 2003).

Our findings lead us to similar conclusions, suspecting that the decrease in exam scores leads to a decrease in motivation, and that “supporting student motivation…would lead to higher achievement” (Young et al. 2018). This makes sense, that as students

receive negative feedback about their course performance, their confidence levels decrease (Zusho et al. 2003). It is essential for instructors to express to students the importance of maintaining motivation to succeed in the course. HAP is learnable and positive results are achievable if the work is put in. Zusho et al. 2003 suggests that instructors convey to their students strategies or ways of thinking to better learn the material and encouraging students to share with each other how they better learn the material. A study by Ferland et al. 2022 assessed the motivation in a statistics course and found motivational semester declines as well. In an effort to avoid this decline, they incorporated "statistics in the news" where students brought in articles that could relate to what they were learning. This promoted students making a connection between the course material and their own lives (Ferland et al. 2022). This could be useful in HAP courses as well, as relating the material to students' lives might help them better understand what they are learning. Further research in HAP courses needs to be conducted to determine specific ways that student motivation can be maintained from the start of the semester to the end of the semester. If we can determine how to encourage students to stay motivated, test scores and final course scores will increase.

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Table 1. Mean exam scores and earned course score of students who participated in surveys.

Exam 1	60.8
Exam 2	52.3
Exam 3	53.4
Exam 4	49.7
Exam 5	44.2
Earned course score	77.0

Table 2. Student responses to select questions from survey 1. (SD= strongly disagree, D= disagree, N= neutral, A= agree, SA= strongly agree).

Statement	SD	D	N	A	SA	P - value
I think I will make a good grade in this class (survey 1 questions 1).	0	1	61	151	51	0.000
I will work hard to do well even if I do not enjoy the material being taught (survey 1 question 2).	0	0	1	85	178	0.017
I am only taking this course because it is required for my major/post-college career (survey 1 question 4).	13	49	70	81	50	0.012
I will work hard to get good grades even if I do not enjoy the material being taught (survey 1 question 6).	0	0	1	72	181	0.033

Table 3. Student responses to select questions on survey 2. (SD= strongly disagree, D= disagree, N= neutral, A= agree, SA= strongly agree).

Statement	SD	D	N	A	SA	P-value
I have made good grades in this class thus far (survey 2 question 1).	4	44	101	102	12	0.00
I do not really enjoy the material being taught, but I am still studying hard in order to do well in the class (survey 2 question 2).	11	100	90	52	10	0.008
I have attended lecture and paid attention (survey 2 question 3.	3	3	33	129	96	0.00
This material is too difficult. I do not feel motivated to study if I cannot understand (survey 2 question 6).	15	121	80	41	6	0.001
I am learning and understanding the material, not just memorizing it (survey 2 question 8).	0	24	83	126	12	0.005
I am glad I am taking this class (survey 2 question 10).	5	19	80	103	34	0.003

Table 4. Student responses to select questions from survey 3. (SD= strongly disagree, D= disagree, N= neutral, A= agree, SA= strongly agree).

Statement	SD	D	N	A	SA	P-value
I am going to make a good grade in this class (survey 3 question 1).	8	32	92	74	19	0.000
I worked as hard as I could to understand the material being taught (survey 3 question 2).	0	16	47	108	54	0.001
I wish that I had put more effort into this course (survey 3 question 4).	4	39	71	83	27	0.000
I spent as much time as needed to understand the material (survey 3 question 5).	5	27	93	75	24	0.009
I worked as hard as I could to get a good grade in the course (survey 3 question 6).	0	14	67	87	49	0.000
I enjoyed learning about A&P and feel confident in my knowledge of it (survey 3 question 8).	4	25	99	65	24	0.000
I would recommend this course to other students (survey 3 question 9).	12	41	90	53	21	0.000
I am glad I took this course (survey 3 question 10).	9	20	81	69	38	0.000

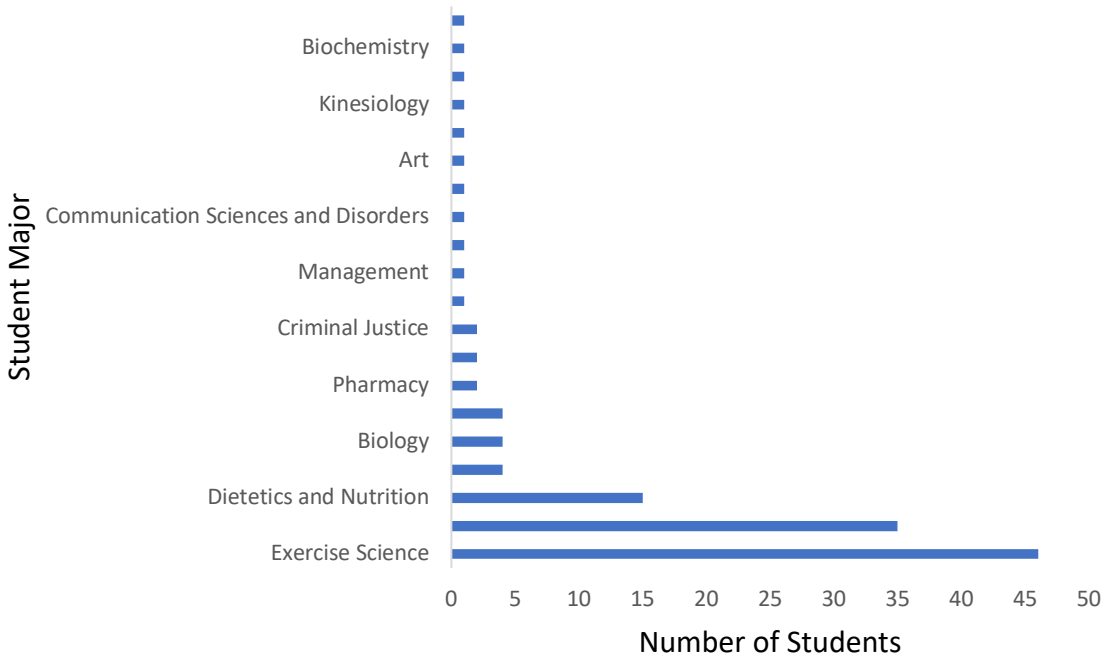

Figure 1. Majors of students enrolled in Bisc 206 in Fall 2021.

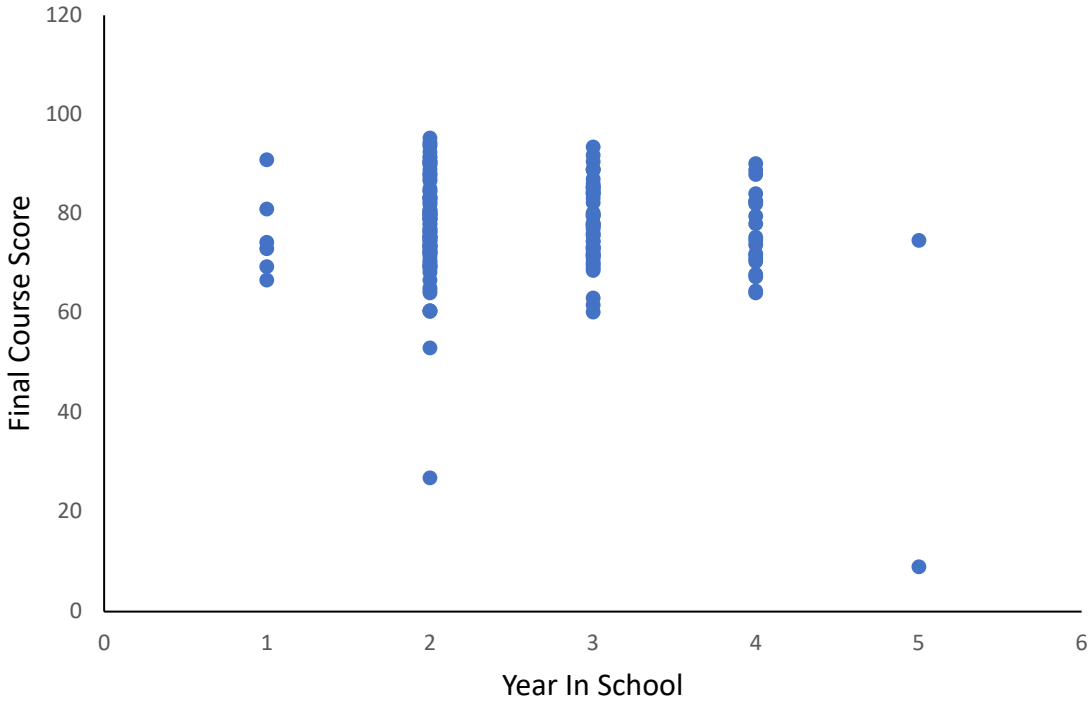

Figure 2. Final course scores based on students' year in school. 1= Freshman, 2= Sophomore, 3= Junior, 4= Senior, 5= 5th year.

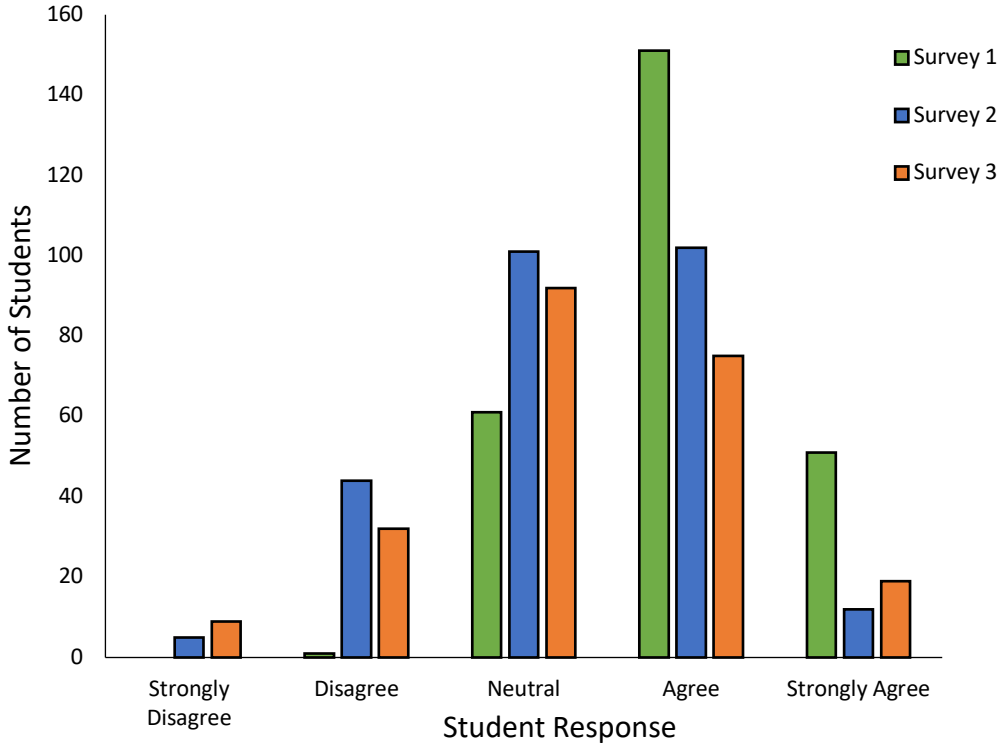

Figure 3. Student responses to question 1 on surveys 1-3. Survey 1: I think I will make a good grade in this class. Survey 2: I have made good grades in this class thus far. Survey 3: I am going to make a good grade in this class.

APPENDIX A

Survey #1

Lab section: _____

Seat # _____

Age:

Sex (optional):

Year in school:

GPA (optional):

Cultural background (optional, circle all that apply): first-gen, ethnic minority, ethnic majority, gender minority, gender majority
Major:

Please circle the number that matches your response to each question. Your rating should be on a 5-point scale where **1= strongly disagree** and **5= strongly agree.** Do not forget to answer the questions on the back of this page.

1. I think I will make a good grade in this class.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

2. I will work hard to do well even if I do not enjoy the material being taught.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

3. I will try my hardest to attend every lecture.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

4. I am only taking this course because it is required for my major/post-college career.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

5. I will spend as much time as it takes to understand the material being taught.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

6. I will work hard to get a good grade even if I do not enjoy the material being taught.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

7. I will complete practice questions and review assignments to study for exams.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

8. It is important to me that I learn and understand the material I am being taught in class.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

9. I will be an active learner and ask questions when I need to.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

10. I am taking this class for the pleasure that I experience in broadening my knowledge about subjects which appeal to me.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

APPENDIX B

Survey #2

Lab section: _____

Seat # _____

Please circle the number that matches your response to each question. Your rating should be on a 5-point scale where **1= strongly disagree** and **5= strongly agree.** Do not forget to answer the questions on the back of this page.

1. I have made good grades in this class thus far.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

2. I do not really enjoy the material being taught, but I am still studying hard in order to do well in the class.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

3. I have attended lecture and paid attention.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

4. I have given myself enough time to prepare for the exam, so that I don't have to cram.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

5. I am spending as much time as needed in order to learn and understand the material.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

6. This material is too difficult. I do not feel motivated to study if I cannot understand.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

7. I have utilized my resources (practice questions, reading the textbook, reviewing quizzes, office hours) to learn the information being taught.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

8. I am learning and understanding the material, not just memorizing it.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

9. I am an active learner and ask questions when I need to.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

10. I am glad I am taking this class.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

APPENDIX C

Survey #3

Lab section: _____

Seat # _____

Please circle the number that matches your response to each question. Your rating should be on a 5-point scale where **1= strongly disagree** and **5= strongly agree.** Do not forget to answer the questions on the back of this page.

1. I am going to make a good grade in this class.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

2. I worked as hard as I could to understand the material being taught.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

3. I attended lectures and paid attention throughout.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

4. I wish that I had put more effort into this course.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

5. I spent as much time as needed to understand the material.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

6. I worked as hard as I could to get a good grade in the course.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

7. I completed practice questions, read the textbook, reviewed quizzes, and attended office hours to better learn the material.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

8. I enjoyed learning about A&P and feel confident in my knowledge of it.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

9. I would recommend this course to other students.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**

10. I am glad I took this course.

1	2	3	4	5
Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**