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# Creating Extra Credit Assignments That Challenge, Inspire, and Empower Students

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## Abstract

Extra credit assignments are often viewed with disdain by educators as opportunities to earn points for students that lack the study skills to do well on exams and quizzes. However, these assignments can serve as a platform for students to apply the course material to their own lives, optimizing their strengths and creativity, and encouraging them to take ownership of their learning. In this paper we discuss how we used extra credit assignments in a two-semester Human Anatomy and Physiology course to develop community outreach, art exhibits, and education events to empower our students and make science accessible to the public. <https://doi.org/10.21692/haps.2020.104>

## Introduction

Among educators, extra credit assignments can be a controversial topic. For those that oppose the practice, the rationale is that if the student cannot complete the required work, when and how will they be able to complete anything “extra”? Other, well-supported reasons for not offering extra credit may include not wanting to inflate grades, the possibility of discouraging students from doing their best by providing the cushion of extra credit points, and the creation of assignments that do not enhance student learning while increasing the burden of grading for the instructor (Dunn and Halonen 2019). For those that support extra credits, justifications are many and varied. Supporters view extra credit assignments as opportunities to reinforce content, to motivate and enhance participation, and to decrease student stress (Dunn and Halonen 2019). In practice, the value of extra credit is dependent on its structure, the method of implementation, the extent of integration of extra credit into the course, and the intentionality of the extra credit assignment.

Good extra credit assignments must connect to course content and support the course objectives. They must be clearly explained, stating in the syllabus the maximum range of points that can be earned by doing extra credit in addition to other course assignments and policies. The deadlines for extra credit must be explicitly stated and adhered to, as they are for all other assignments. By including the extra credit assignment in the syllabus, the instructor offers this opportunity to everyone in the course, without prior knowledge of the academic progress of individual students in the course. Similarly, by clearly describing the assignment and its worth, the instructor creates a set of expectations that are available to all students; this can help students assess whether they are willing to put in the extra effort to earn the extra points, plan their time accordingly, and discourage special last-minute requests (Dunn and Halonen 2019).

In our experience, extra credit assignments can serve as a reward and as an opportunity to apply course content outside the classroom. While the assignment itself can require effort, it can also be an enjoyable, enriching activity that gives students agency and choice, is educational, and gives students the means to connect with the material in a whole new way. The extra credit assignment can also be an opportunity for faculty and students to collaborate and develop interdisciplinary projects that reach beyond the classroom and have a positive impact on the community. It is these latter reasons on which we have capitalized when incorporating extra credit in our Human Anatomy and Physiology two-semester course at Elizabethtown College.

## Description of the Assignment

Elizabethtown (ETown) College is a private, liberal arts institution with approximately 1700 students. The Human Anatomy and Physiology course at Etown is a two-semester course, taken primarily by Pre-Health and Occupational Therapy majors in their sophomore and junior years. The only prerequisite for the Anatomy and Physiology course is successful completion (grade C- or better) of General Biology 1. Like most Anatomy and Physiology courses, lectures and labs consist of face-to-face biweekly meetings. Lectures include traditional lectures, demonstrations, group discussions and activities. The lab component is station-based, where students are introduced to various aspects of the skeletal and muscular systems with teaching assistants as facilitators. In our course, lecture and lab must be taken concurrently, with lab making up 45-50% of the course grade. The variation in the lab grade percentage reflects differences in assignments and their weights in different semesters and in different years.

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Each semester, students in Goldina’s class are given the opportunity to complete up to two extra credit assignments. The assignments are divided into two categories; students can complete only one assignment from each category (Table 1). Category One includes reflective/analytical assignments, such as explaining how a specific topic in Anatomy and Physiology directly relates to a student’s life, or researching whether a particular popular idea about the human body or process is a myth or supported by scientific evidence. Category Two is a more creative option where students are asked to use their knowledge of Anatomy and Physiology and apply it to another field by creating an artistic piece using any medium they like, developing a song/poem, choreographing a dance or a skit, or writing a children’s book to represent a specific topic or theme in the course. Detailed descriptions of these assignments, as well as their point values are included in the syllabus and students are aware of their options from the first day of class.

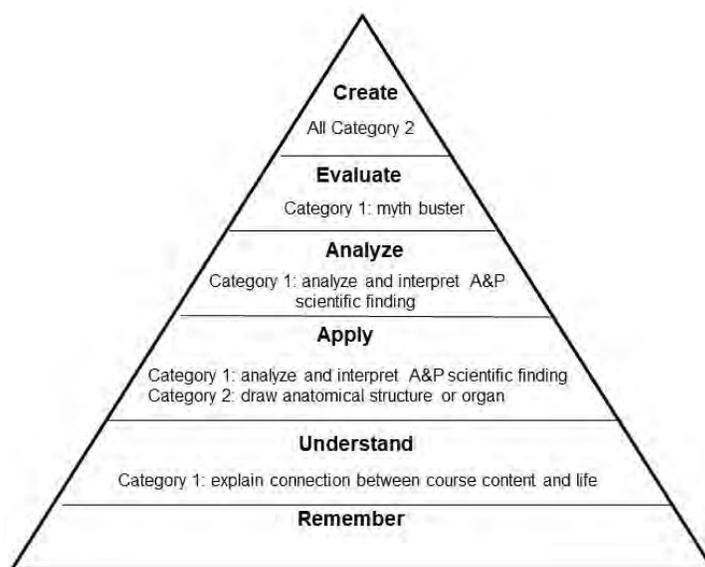
Category 1 – Reflective	Category 2 - Creative
1. Page discussion of how a topic from this course relates to everyday life	1. Write and/or choreograph a song/dance/skit about an A&P topic. Be prepared to perform the piece in class.
2. Interpret a recent scientific finding relevant to the topics covered in this course. Explain the significance of the work.	2. Create artwork of an anatomical structure, system, or process. Use any medium and style you like.
3. Myth buster. Use knowledge of A&P and primary literature to dispel or support a common belief about human anatomy and physiology.	3. Write a children’s story, develop a children’s activity to address a specific A&P topic. The story must have a clear question, plot, characters, dialogue, and action.

**Table 1:** Description of Extra Credit Project Options. Students may choose one assignment from each category.

The extra credit assignments are usually open-ended and intentionally vague. Students completing extra credit from Category 1 can earn between 0.5 and 1% added to their total grade. Category 2 assignments are more laborious and require more creativity, and time investment. Depending on the complexity of their work, accuracy, depth, attention to detail, and quality of execution, students can earn an additional 1-2% towards their final grade. Thus, completing both extra credit options, can potentially improve the student grade by 3%. This increase is not significant enough to replace poor quality

of work on exams or quizzes, which might reflect lack of content knowledge. Despite the very small grade boost these assignments provide, up to 94% of students participate.

The original impetus for creating these specific categories was to encourage students to think about the course content outside of the classroom and to recognize the relevance of the material in their daily lives. Many Etown students are very creative; they minor or major in music and art and learn various crafts in their Occupational Therapy classes. Being able to apply their passions to material with which they do not necessarily feel comfortable allows them to take ownership of the content. By connecting the seemingly impossible content with their strengths and passions (i.e. dancing, art, music) and allowing students to take this difficult material into their skill set, students are less intimidated by the subject and are empowered to think deeply, critically, and creatively about basic science. This creative process also requires higher levels of cognitive ability, as represented in Bloom’s taxonomy (Figure 1; Anderson and Kratwohl 2001). Depending on the type of extra credit they choose (Table 1), they must be able to apply, analyze, synthesize, and evaluate the material, not simply memorize and understand.



**Figure 1:** Anatomy and Physiology Extra Credit Assignments and Bloom’s Taxonomy of Learning. Extra credit assignments encourage the development of higher levels of learning classified according to Bloom’s taxonomy.

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## Extra Credit Projects - Impacts Beyond the Classroom

Importantly, the extra credit projects from Category 2 have served as an opportunity to help students recognize the interrelationships between the sciences and the arts, develop the skills and courage to think creatively, and apply these skills in real world applications (McNealy 2013).

The projects inspired interdisciplinary collaboration between faculty and students and outreach events in the community. Through interdisciplinary collaboration between faculty (P. Licona in Education, P. Ricci in Fine Arts, and A. Goldina in Biology), we developed multiple educational events to share our students' work and their passion for science. Importantly, Etown students participated in developing and executing all of the events described below. Briefly, we have held exhibits on campus in a library and in an art gallery, in the North Museum of Nature and Science in Lancaster, PA, and in the Lancaster Science Factory, a children's science center. These exhibits were advertised by the college and the by museum to the community. Students in the Fine Arts program installed the artwork, while students minoring in Spanish designed a bilingual Spanish-English exhibit program for the public.

We worked with Etown undergraduate Education majors to adapt the children's activities developed by students in the Anatomy and Physiology course into a week-long Anatomy mini-unit in a local kindergarten. The Education majors developed lesson plans that met state-mandated learning objectives. Many students from the Anatomy and Physiology courses participated in running these lessons, thus seeing their original ideas transformed into tangible activities that were implemented in the classroom. Similarly, the individual art pieces students created for class impacted the public by becoming part of an exhibit that highlighted the presence of anatomy, and science by extension, all around us (Table 2). Thus, all the outreach activities that resulted from these extra credits (Table 2) not only showcased the talent and creativity of the students, but also allowed them to further improve their science communication skills.

Extra credit types	Events they inspired
Art in various forms <ul style="list-style-type: none"> <li>• Paintings / drawings</li> <li>• Sculptures</li> <li>• Clothing</li> <li>• Toys (crochet/ sewn)</li> <li>• Jewelry</li> </ul>	Art exhibits "Anatomy Everywhere" held at the North Museum of Science and History in Lancaster, PA. - 2019  "The Anatomy of our Lives" held in the Lyet Gallery of Elizabethtown College, in Elizabethtown, PA- 2019
Written word <ul style="list-style-type: none"> <li>• Poetry</li> <li>• Short stories</li> <li>• Comics/Cartoons</li> </ul>	"The Anatomy Chronicles" exhibit held in the High Library of Elizabethtown College - 2020
<ul style="list-style-type: none"> <li>• Children's books</li> <li>• Children's games/ activities</li> </ul>	<ul style="list-style-type: none"> <li>• Anatomy mini-unit in local kindergarten - 2019</li> <li>• Activity tables at the Lancaster Science Factory, in Lancaster, PA - 2019</li> </ul>

**Table 2.** Outreach Activities that were Inspired by and Incorporated the Extra Credit Projects

## Summary and Conclusions

In our Anatomy and Physiology course, we have taken a voluntary assignment and transformed it into an activity that can empower students and enrich the community. While, quantitatively, the extra credit projects offer a very small boost to each student's grade (up to 3%), the complexity and quality of projects that the students produced demonstrates that their motivations for doing the assignments went beyond a simple grade boost. We are currently conducting a study to understand the impact of these assignments on students.

Furthermore, the assignments we described can be implemented in various classes, be topic-focused or broad, and be flexible enough to take advantage of the resources and strengths unique to each institution and local resources. For example, in an area where access to museums and art galleries is scarce, it might be possible to do an exhibit in a local library or even on campus. It might also be possible to create a

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day where students share their work with each other. In our experience, students really enjoy seeing each other's work and really look forward to the assignment due date. Importantly, in this current climate, where teaching in person might not be possible, these assignments can be completed and submitted online. In the Spring semester, when most of the semester ended up being online, many of our students took advantage of the various online resources to develop digital art, music, and videos. Finally, as an extra credit, this assignment does not require reworking of the syllabus. Thus, an instructor has a cushion to try multiple reiterations of this assignment to develop the criteria and activities that maximize student and institutional strengths, interests, and resources.

From a pedagogical perspective, these extra credit assignments are important for helping students develop critical and creative capacities, which are essential for their future. Increased reliance on scientific progress and technology in our everyday lives is contrasted by a sharp decline in participation and interest of students in science-related fields (Ledbetter 2012). Our failure as scientists and educators to engage non-scientists has a direct impact on future science policy, government funding of research, and ultimately, the ability of individuals to correctly interpret the relevance of scientific development in their personal lives.

Thus, as scholars and educators, we face the challenges of recruiting and retaining students in the sciences, as well as developing students who, while not scientists, will still be able to utilize, apply, and advocate science to the public. We need to develop innovative, creative thinkers who have the skills to recognize and solve societal problems that we cannot yet foresee. These individuals must be able access a "multidisciplinary toolbox" to develop solutions to complex problems and get support from their communities to enact positive change.

The ability to think across disciplines fosters creativity and innovation. While many students do not initially consider science to be a creative process, and definitely do not recognize connections between art and science, these fields have relied on and inspired each other for centuries. The works created by our students to complete their extra credit reflect their ability to apply their passions, creativity, humor, and artistic abilities to science. By incorporating extra credit projects into our Human Anatomy and Physiology courses, we have not only given students an opportunity to boost their grades, but also empowered them to be positive forces in their communities and to share their skills and talents with those around them.

## Acknowledgement

The Elizabethtown College Collaborative Interdisciplinary Scholarship Grant awarded to A. Goldina, P. Licona, and P. Ricci funded the events described in this paper.

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Patricia Likos Ricci, PhD, is the Director of the Fine Arts Department and Professor of the History of Art at Elizabethtown College. She teaches courses on the Italian renaissance, neoclassicism and romanticism, and American art.

## Literature Cited:

- Anderson LW and Kratwohl DR. 2001. *A Taxonomy for Learning, Teaching, and Assessing: a Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.
- Dunn DS and Halonen JS. 2019. The extra-credit question: should you offer it or resist? *Chron. Higher Educ.* <https://www.chronicle.com/article/the-extra-credit-question-should-you-offer-it-or-resist/>
- Ledbetter MLS. 2012. Vision and change in undergraduate biology education: a call to action. *J. Undergrad. Neurosci. Educ.* 11(1):A22-A26. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3592749/>
- McNealy T. 2013. Connecting music, art, and science for increased creativity and topic engagement. *J. Micro. Biol. Educ.* 14(2):267-268. <https://doi.org/10.1128/jmbe.v14i2.611>