
The Art of Anatomy: Engaging Student Creativity in Undergraduate Anatomy Courses

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Abstract

Creativity is widely accepted to be a valuable skill to hone, but it is often difficult to define and even more difficult to measure. Artistic endeavors and creativity have historically had a close relationship with the sciences. However, recent trends have largely removed creativity from scientific inquiry and education. This shift has led to a large proportion of the coursework in anatomy fields to be strictly delivered via textbook and lecture and learning only gauged through quizzes and examinations. In the current work, we examined the assigning of creative projects during two semesters of a large undergraduate anatomy course at the University of Kentucky. We describe the showcasing of these creative works in both in-person and virtual formats. Future work will explore long-term impacts on student humanitarianism and professionalism as a result of the creative assignments. <https://doi.org/10.21692/haps.2021.019>

Key words: education, arts, humanities, science, virtual, anatomy

Introduction

The relationship between the study of anatomy and the study of the creative arts has a long and storied history. In recent decades, there has been a marked emphasis placed on the teaching and learning of anatomy as a hard science, with a dismissal of much of the humanities that are inherent in the study of the human body. Thankfully, the past few years have shown a resurgence of the unity between anatomical science and the inborn artistic nature of the field (Bell and Evans 2014).

There are varying degrees of creativity, and the word can mean something different to each individual and the context in which they learn or work. While it may seem that creativity should be easy to explain, multiple sources have defined it in multiple ways. The Oxford Reference *A Dictionary of Psychology* has perhaps one of the most useful and explicit definitions of creativity: "The production of ideas and objects that are both novel or original and worthwhile or appropriate, that is, useful, attractive, meaningful, or correct." (Colman 2015). While this is a rather thorough explanation of creativity as a concept, it still leaves one wondering who is to define what makes something useful, attractive, or meaningful? It is a curious thing that we all have a capacity to recognize something we feel to be creative when we see it, and yet cannot exactly measure or explain what qualifies something as creative work.

Several recent reports discussed the opportunities and advantages offered by the inclusion of creative outlets in the study of anatomy. For example, students who completed a creative project during the early stages of their medical education reported a greater sense of gratitude, and that the project served to help with their stress levels (Shapiro

et al. 2009). A similar qualitative study found that medical students who created artwork as part of their curriculum reported not only a feeling of personal development and growth, but also an increased sense of community (Jones et al. 2017). One university in the United Kingdom compels their students to produce creative work as a required part of the medical curriculum, and noted that while it may seem at face value to be counterintuitive to force creativity, it also resulted in having students who would usually dismiss artistic outlets being required to actually explore their creative side (Thompson et al. 2010a). The University of the West Indies in Barbados conducted a study during which students produced a creative product (poem, story, music, etc.) to enhance the study of the muscles of the body. The authors reported not only that the students claimed to have found the exercise valuable on a post-activity survey, but also demonstrated an improvement in exam scores as a result of the intervention (Singh et al. 2019).

While it seems that there is a growing body of support for inclusion of creative exercises in medical and professional curricula, there is a largely untapped opportunity to introduce such work in undergraduate courses. Anatomy is in an excellent position to do this, as many of the students who take undergraduate anatomy courses have goals of becoming healthcare professionals. Furthermore, anatomy and the creative arts have long been intimately entwined. Some undergraduate anatomy instructors across the United States have been incorporating the arts into their classrooms for several years. For example, Dr. Anya Goldina at Elizabethtown College asked pre-professional students to create artworks in the theme of anatomy (Moyer 2020). One

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student who participated in the art project in Dr. Goldina's class said, "It [the course material] becomes easier for us to understand, not just because of the time we put into researching and creating the projects, but we get to see the systems through the eyes of our peers who break it down into parts that are easier to understand." (Moyer 2020)

Historically, there has been little-to-no distinction between the study of anatomy and the production of images to represent the anatomy as it is seen. As early as the Alexandrian era, the students of anatomy were creating sketches of what they learned from their dissection (Mavrodi et al. 2013). Many of the great artists of the Renaissance were compelled to study anatomy in order to produce the artistic works that were as accurate as they could be. It is well known that Leonardo da Vinci dissected somewhere around the order of 30 cadavers, though his notebooks full of amazingly detailed and rather beautiful anatomic sketches were lost for a great time after his death (Jones 2012). This tight interrelationship between the study of art and the study of anatomy seems to suggest that it is only natural to carry on the rich history of encouraging creation in the course of anatomic study (or vice versa).

Despite this natural union, one could argue that there has been a dearth of creative expression in science courses in recent decades, anatomy included. In fact, some articles discussing best practices for anatomy teaching do not even mention creativity as a modality (Brenner et al. 2003; Estai and Bunt 2016). The focus for anatomy instruction seems to still lean heavily on traditional methods, often encompassing didactic lecture and some sort of technical laboratory experience, with a smattering of active learning techniques (case-based learning, flipped classroom exercises) sprinkled in.

The goal of this project was to explore the impact of offering various opportunities for incorporation of creativity in the undergraduate (pre-professional) anatomy classroom. While one of the greatest hurdles was likely student buy-in, there were many examples of beautiful, unique, and high-quality student works that truly demonstrate their growth and learning in ways that cannot be captured on a final examination.

Description

The work described in this manuscript was designated by the Institutional Review Board at the University of Kentucky as a quality improvement project and did not require formal review. The course in which the creative projects were implemented was ANA 209: Principles of Human Anatomy. This one-semester course is typically made up of sophomore,

junior and senior undergraduate (pre-professional) students, many of whom aspire to apply to medical school and other professional programs. In an average year, the enrollment ranges from 120-220 students.

Anatomy Portfolio Showcase 2019

In the spring offering of ANA 209, a portion of the final grade was compiled from an assortment of works in the Anatomy Portfolio. This included a series of creative projects that paralleled anatomy topics in the latter half of the course, including the nervous, cardiovascular, digestive and urinary systems. Students were given a prompt for diverse art forms and general parameters, such as literary or visual submissions and examples of possible media. The projects submitted were sometimes fanciful and elaborate, from food items being used to represent the digestive system to full Lego sculptures to represent Bell's Palsy in the nervous system unit.

The Anatomy Portfolio consisted of five creative projects (total of 28 points) and one reflection document, all of which were mandatory and comprised 9.7% of the student's final grade. The projects were assigned as follows: abstract art on a neurodegenerative disease (5 points), poetry on blood flow through the heart (5 points), a collage of digestive system anatomy (7 points), creative media kidney art (6 points), and a photography challenge of anatomical principles in nature (5 points). Students had approximately two weeks to complete each assignment and received credit based on their adherence to the specific assignment prompt (see below) as well as the evidence of effort given to the project. In addition, students were required to label and/or color code the pertinent structures in order to sufficiently convey the concepts of anatomy covered in the unit. Over 500 submissions total were turned in during the semester for the portfolio assignments across the various artforms.

A brief description of each assignment and representative example(s) are included below:

Photography: Students were asked to identify and take a picture of an object, organism, or area in its natural form that relates to an anatomical structure/concept from the systems taught in the last two units (nervous, cardiovascular, lymphatic, endocrine, respiratory, digestive, urinary, and reproductive systems). These images could be realistic or abstract (Figure 1). A brief explanation (two paragraphs or less) of the analogy was required to provide context for the nature comparison.

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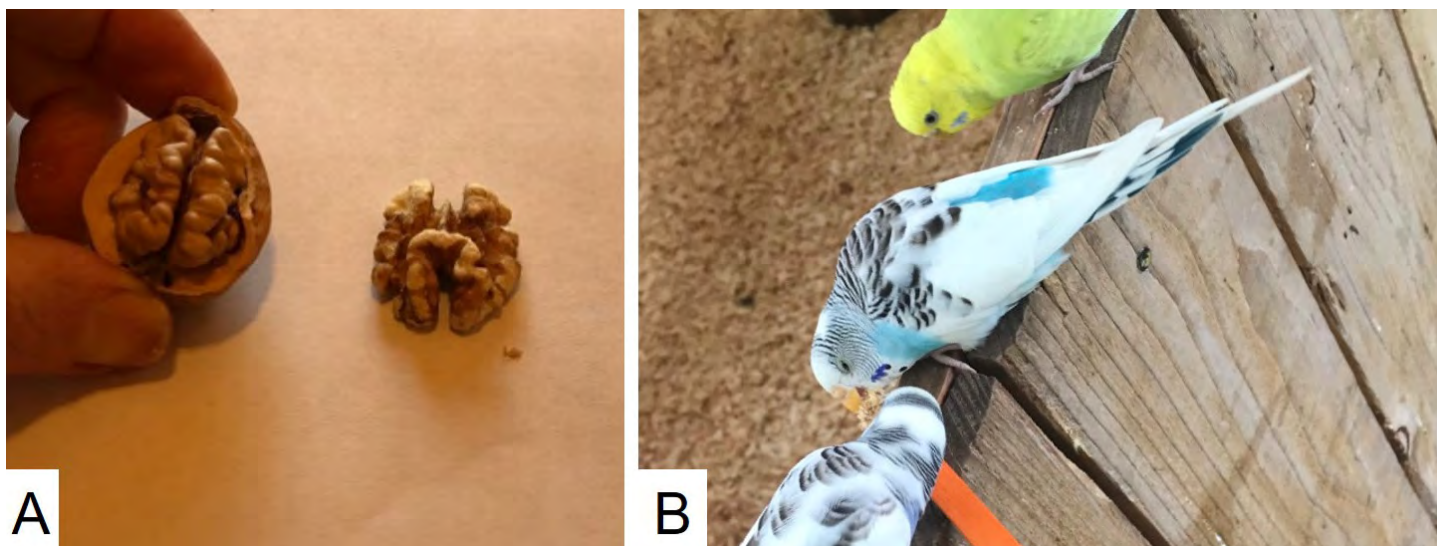


Figure 1. Photography. A. Credit: Katie Koester. The artist explains, “The walnut itself resembles the cerebrum, where its irregular surface is reminiscent of the gyri and sulci of the cerebrum. The walnut has two ‘cerebral hemispheres,’ with a raised part that connects the two. This is similar to the corpus callosum, which connects the right and left hemisphere of the brain.” B. Credit: Lillian Hutchens. The artist says, “The anatomy of the liver resembles a bird with its head down... The curve under the bird’s neck is where the gallbladder would be found.”

Heart Poetry: A literary prompt written by the instructor was given as a sample for using poetry to describe the blood flow through the heart (Figure 2). Students were provided a list of heart structures to include in their composition. The poem was to be structured in two columns and formulated in such a way that it was understandable whether read down or across. The left column introduced the technical language of the heart bolded in the order of blood flow through the heart and provided context for these structures. Additionally, the right column expanded on the first column and described the features of the heart in more abstract terminology.

In a Breath by Laura Mendenhall

As I begin my journey, to feed my body
I am starved of life’s breath.
Entering through the **Right Atrium**,
I am welcomed into the arms
of the **Pectinate Muscles**
which are pulsating and gentle.
They push me into the **Right AV Valve**,
The **Right Ventricle**, larger than I dreamed,
the **Papillary Muscles** work with
Trabeculae Carneae to shoot me
through to the **Pulmonary Trunk**
down the path the **Artery** takes
to the **lungs**,
Here, I stop in awe.
Then, too soon I am swept back
into the **Left Atrium**, moving quickly
through the hallway known as the
Left AV Valve to enter
the **Left Ventricle**, by far the largest and
strongest,
place I have ever seen.
One last contraction, and I am flung
through the **Semilunar Valve**,
into the **Aorta**, a highway.
In a breath, I am free.

I swirl, anticipating arrival.
The beautiful, the mighty substance,
I need to quench my thirst
of the most important organ.
Strong, muscled walls,
surround me in a plush blanket.
I enter and unworldly place,
and so many of my kind fill the space.
A duo, they are stronger [than] imagined
to the next step in my journey,
what I have been anticipating,
the place where I am finally filled;
lungs.
I am received, I give, and I take.
A sudden movement, through.
Too fast, I run
the place that will show me
the light,
the place that is the
most powerful
And I am held, a moment in time.
In a breath,
I am taken
Running, finally to my destiny,
Bringing life.

Figure 2. Heart Poetry. Credit: Laura Mendenhall. Poem representing blood flow through the heart.

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Digestive system collage: Students were instructed to create a collage that illustrated one of the following: 1) the anatomy of the entire digestive system, with an emphasis on how food moves through the system (Figure 3A), 2) the histology of an organ of the digestive system, 3) a detailed collage of the anatomy of a single organ of the digestive system (Figure 3B), or, 4) a disease of the digestive system (e.g., irritable bowel syndrome, appendicitis, gastroesophageal reflux disease, hiatal hernia). The materials used for the collages were diverse, ranging from newspaper clippings to real food items.



Figure 3. Digestive Collage. A. Credit: Candy Lu. Cereal medium to represent the gastrointestinal tube and accessory organs. B. Credit: Luke Archer. Fruit Rollup medium for the diverticulitis in the sigmoid colon. The inflamed diverticula are depicted with red lifesavers.

Creative kidney media: Students were prompted to illustrate a sagittal view of the kidney using their creative media of choice (Figure 4). Instructions were deliberately non-restrictive and encouraged students to keep an open mind, explicitly mentioning that students were not limited to the media suggested. Some media ideas included food (e.g., candy), plants (e.g., flower petals) metal (e.g., coins), plastic (e.g., Perler beads), and cloth (e.g., cross-stitch). A list of terminology specific to the kidney was provided in the instructions, along with the stipulation that each term be clearly marked in a key on the actual art submission. The list of anatomical landmarks included defining features of a sagittal view of the kidney, such as lobes and collecting structures.

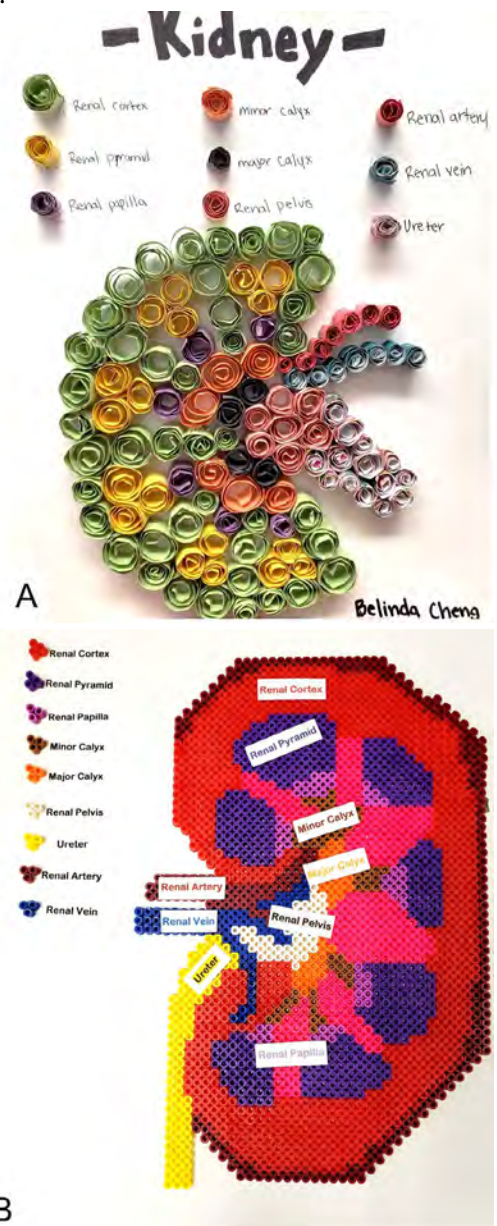


Figure 4. Kidney Creative Media. A. Credit: Belinda Cheng. Kidney in rolled paper units. B. Credit: Megan Bossle. Kidney in Perler beads.

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Nervous system abstract art: Students were given a podcast to listen to as preparation for this task to reflect on diverse expressions of anguish as experienced by patients with a neurodegenerative condition. The Radiolab podcast “Unraveling Bolero” describes how the composition “Bolero” by musician Maurice Ravel and the painting “Unraveling Bolero” by visual artist Anne Adams reflect their cognitive decline from frontotemporal dementia (Radiolab 2018). For this assignment, students chose a neurologic disease/

condition of interest and created a piece of visual art that depicted some aspect of this topic. Students were given the freedom to express their art abstractly, like Anne Adams’ “Unraveling Bolero,” or realistically (e.g., a portrait of a loved one with Alzheimer’s) (Figure 5). Once again, students provided a brief written explanation (less than two paragraphs) for the audience to elaborate on how their art related to the disease they chose.



Figure 5. Nervous System Abstract. A. Credit: Latasha Jones. Depiction of Bell’s palsy in Lego medium. B. Credit: Gaby Reyes. This painting represents supranuclear palsy. The artist notes that her grandfather was affected by this disease, and that “My painting represents his body as the body of an alien, because I believe that is what he feels like when we are all around. The nasogastric tube in my painting represents my grandfather’s inability to eat or swallow on his own.” C. Credit: Candy Lu. Flowers and flower petals to represent the progression of Alzheimer’s disease. D. Credit: Allison Lindsey. This pencil and ink composition depict an elderly lady with Alzheimer’s disease. The artist notes that the burned areas of the paper represent the “degeneration of her brain cells and the ultimate destruction of her memories.”

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The top twenty projects in each submission category were determined by a panel of two anatomy educators and two teaching assistants and these exemplary submissions were featured in the Anatomy Portfolio Showcase during the last hour and fifteen-minute class period before the final exam. The members of the selection panel viewed all of the submissions for each unit and independently ranked their preferred artworks based on aesthetic, quality, perceived effort, visual appeal, originality and creativity. After the independent viewing, panelists conferred on which submissions should make the top 20. Generally speaking, the top 15 were fairly unanimous, while it was more difficult to decide which pieces should fill the final 5 slots.

At the Showcase, the projects were displayed by category at various points throughout the stadium-style lecture hall; for example, the nervous system art was arranged on two tables on the bottom floor, while the kidney and digestive system art were set up on the second level. Photography art was featured on a rotating PowerPoint slideshow (every ~40 seconds) near the front of the room, and heart poetry was printed out, mounted on cardstock and displayed on the side walls. The way in which the showcase was set up throughout the entire large-classroom space allowed for a gallery-like feel to the experience, where students could enter and leave “exhibits” and intermingle with their classmates. Additionally, instrumental music was streamed from a computer in the background to add ambience to the experience.

The showcase allowed for a unique, dedicated time for students to acknowledge and reflect on their peers’ creative efforts in the course. Part of the grade for the Anatomy Portfolio included completion of a guided reflection document that students filled out as they visited stations. They were asked to identify their favorite submission in each category and reasons for their choice, including how the piece related to their understanding of the correct anatomical structure and disease progression. Many students included works of art that reflected how a disease had impacted their lives, such as featuring a family member’s battle with Parkinson’s Disease or Alzheimer’s, and this resonated with classmates who had similar experiences with their own friends or family members.

The Anatomy Portfolio Showcase served as a personal and classroom community-enriching experience. For example, students whose work was selected in the top twenty were recognized in class and congratulated by peers along the way. Anecdotally, there were more opportunities for the classroom instructor to interact with students in a non-didactic, meaningful way, especially in a large classroom. In fact, the course director remarked: “I knew my students on a more individual and holistic level than ever before.” The event was also shared with the larger academic community at the University, as it was highlighted in “UKNow,” a digital newsletter published by the University of Kentucky (Wells 2019).

Anatomy Portfolio Showcase 2020: Impact of COVID-19

In 2020, as classroom environments shifted abruptly from in-person offerings to largely Zoom-mediated learning spaces in response to COVID-19 restrictions, educators were confronted with new obstacles for engaging students behind the box. Despite the challenges with online learning only during this spring semester, the instructors wanted the essence of the showcase to continue. For this iteration of the showcase, the top 30 art projects on the nervous system only were featured in a Zoom session over a four-hour time frame (Figure 6).

Due to in-person restrictions, students submitted a picture of their artwork using the learning management system (Canvas®) and these images were compiled into a PowerPoint presentation. The online session was planned as a virtual gallery experience, where students logged into the session at their leisure during the given timeframe. Each artistic depiction was featured for approximately 40 seconds before rotating to the next slide. A short paragraph description was provided alongside the art to provide context. Similar to the in-person showcase from the prior year, music was played in the background while students viewed the art and reflected upon their favorite nervous system submission. These reflections were submitted via Canvas along with a code that students received when they logged into the session. This reflection assignment was counted as extra credit.

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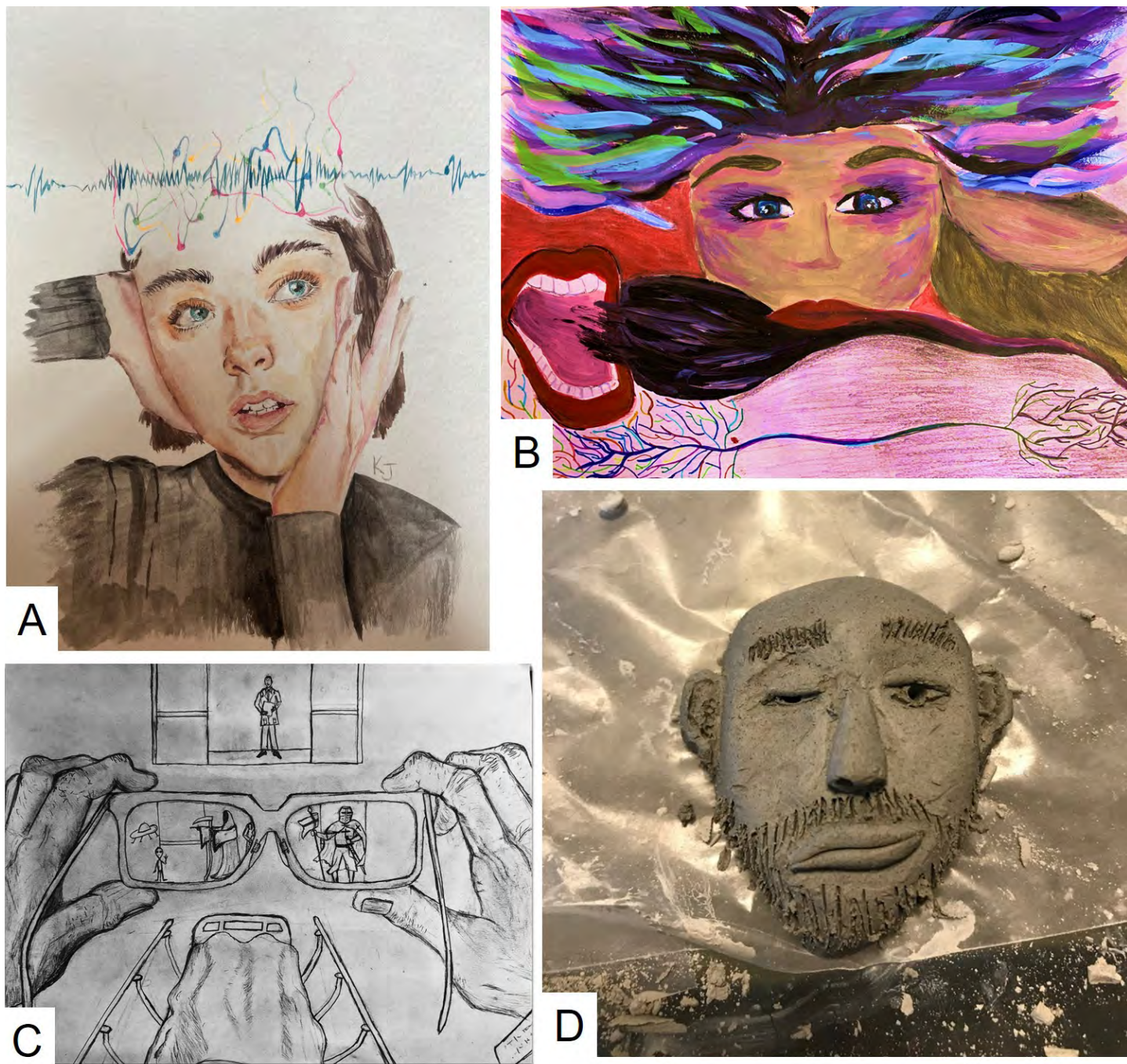


Figure 6. Spring 2020 Nervous System. A. Credit: Keeley Justice. Epilepsy in watercolor. The artist states: "These colorful neurons are an abstract representation of a brain scan from an individual undergoing an epilepsy seizure. The overlaid image of the zig-zag line represents the increased electrical activity that causes convulsions and other symptoms of epilepsy." B. Credit: Alivia Houser. Alzheimer's disease. The artist explains: "The many colors coming out of her head signify her as a woman and her personality. The black consuming the colors is a representation of the neuron death occurring in her brain and slowly wiping away the woman she was before the disease. The screaming mouth signifies the frustration that comes from this disease." C. Credit: John Whitt. Dementia in pencil. The artist explains that they have worked in an emergency department and that "These patients present, (often after family intervention), with confusion, delusions, hallucinations, decreased capacity to complete activities of daily living (ADLs), and other dangerous or paranoid behavior." The artist, "wanted to do a symbolic drawing that represents how awful dementia can be." D. Credit: Lauren Eckert. Clay sculpture of Bell's palsy. The piece as photographed does not illustrate scale. As the artist explains, "The finished piece was about two inches tall. I used toothpicks and a sewing needle to make the different lines."

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Discussion

There is little denying that there has long been a tight connection between the study of the arts and the study of medical sciences, perhaps especially so for anatomy. While making art may not always improve student anatomical knowledge, it likely has fringe benefits such as student-perceived effects on critical observation and coordination (Collett and McLachlan 2005). However, the union of these two fields in the modern classroom of higher learning faces some unique challenges. With some forethought, the inclusion of humanities in anatomical study can offer great benefit beyond didactics to the students as well as the instructors, and possibly encourage the participants to learn things outside the confines of the textbook.

Community

Community in the classroom is an established pedagogical paradigm for K-12 education, as a strong sense of social belonging and connectedness has been shown to contribute to higher student success and to increased student engagement (Dewsbury and Brame 2019; Miller et al. 2017; Walton et al. 2012). Community in the classroom refers to the sense of shared purpose and engagement in the learning experience (Vora and Kinney 2014). It is intimately tied to Paulo Freire's thoughts on the freedom from oppression in education, where dialogue between the teacher and student is fluid (Collins et al. 2020; Freire 2013).

One way of using this principle of Freire's work is to consider the "Pedagogy of People", as interpreted by the Center for the Enhancement of Learning and Teaching at the University of Kentucky, where teaching practices should "invite, value and accommodate the full humanity of students, including lived experiences which may affect the way they learn." (Collins 2020). As one reflects on the last year of online-mediated learning compounded with individual and societal stressors induced by COVID-19, social injustice and unrest, and overall disruption of routine activities, it is reasonable to assume that these conditions impacted the students in our classrooms, and their ability to focus and fully engage in the learning experience. However, creative projects in a primarily fact-based curriculum permit students to bring their life experiences into the classroom. They provide an outlet for sharing a myriad of experiences—success, failures, sorrows, regrets, aspirations—that make us human.

Furthermore, the recent theme "Students as Partners" (SaP) in teaching and learning has gained momentum as a method that encourages student buy-in and engagement (Healey et al. 2014). In this approach, the educator intentionally provides opportunities for students to build aspects of their educational experience, including but not limited to, standards for professionalism, types of formative assessments, and evaluation criteria. This classroom approach discourages the classic "sage on the stage" mode

of instruction and relinquishes some of this authority to the learners while being grounded in student free expression, which ties back to Freire's principles (Kapadia 2021).

Creative projects in A&P classroom encourage SaP principles by inviting students to explore the shared pool of anatomy knowledge, both in the literal understanding and in the metaphorical sense of the human body. Such integration of facts with personal touch allows for a more meaningful community experience in the classroom. As the classroom of today seeks to better understand and acknowledge the diverse students that contribute to the learning environment, creative projects provide unique opportunities to accomplish this task.

Higher-order Learning Objectives

A common thread across teaching from preschool to post-graduate training is the application of Bloom's Taxonomy (Bloom 1956). Lower-level learning items on the taxonomy such as "remember" and "understand" tend to be considered lower yield for the learner, and include such tasks as state, define, describe and explain. Anatomy naturally lends itself very well to remembering and defining exercises – flash cards, anyone? The high-level tasks as described by the taxonomy, such as "create" and "evaluate," are considered to be the end goal for what our learners should be able to achieve. Some of the key words associated with these highest levels include design, develop, appraise and critique.

Almost immediately, one can see the connection between these higher end Bloom's Taxonomy verbs and the utility of assigning a creative project. Students can easily be moved into the realm of designing and developing simply by being asked to create a new artistic work. As communicated by a student in the UKNow article, "[doing the creative project] really helps you learn because you're putting a lot more effort into thinking about (anatomical structures). You have to really understand what it is before you begin thinking about creative ideas you want to use to depict it." (Wells 2019) And just as readily, students can be moved into the realm of evaluation: appraisal and critique could be prompted by having students share their creative product with their peers and soliciting peer-to-peer feedback on the work. Achieving these higher end taxonomy targets can be quite challenging at face value, but the inclusion of creative projects in the curriculum greatly facilitates this goal.

Continuity in the Curriculum

The transition from undergraduate to professional curricula can be a difficult leap for students depending on the extent of prior exposure to application-based learning. Furthermore, the volume and depth of information to learn in a professional curriculum has often been likened to drinking water from a fire hydrant, as opposed to a water hose. This combination of elevated intensity and higher-order learning objectives makes the transition to medical

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education a period of major adjustment for an incoming student (Akinla et al. 2018). Creative projects in pre-professional anatomy & physiology courses may be one way to facilitate this transition by prompting students to apply the facts they are learning in unique ways, plan and manage their time for completion of such projects and sharpen their skills for self-awareness and self-regulation, and ultimately their capacity for empathy.

As many students in undergraduate anatomy courses aspire to attend professional programs in medicine, allied health, or other patient care fields, there is a window of opportunity for exposure to humanities education at this early stage. While medical students are at higher risk for burnout than their peers who are not in professional schools (Hill et al. 2018), investing in creative outlets may reduce risk factors for experiencing burnout (Mangione et al. 2018). In addition, early exposure to non-didactic learning experiences may open the door to further exploration of humanities for these students; in effect, normalizing the inclusion of creative exercises in science & medicine from an early phase.

Having students explore creative outlets in their pre-professional education may enhance their application to those professional programs by expanding their self-awareness in ways that memorizing facts does not. For example, one could imagine a student sharing work from the poetry they wrote for their class in their medical school admissions essay or recalling the emotions they felt at the classroom art show and the impression that left on them to their admissions interviewer. Finally, once these individuals are healthcare practitioners, it may be memories learned from a creative project that they completed that stick with them more than the names of all the muscles of the forearm.

Holistic approaches

There is a growing trend toward encouraging our learners to grow as individuals as much as to learn content that they can recall for an exam. Many would argue that it is simple to learn the basics of many fields, anatomy included, from a textbook or publicly available online resources, with no classroom instruction or instructor needed. What, then, is the role of the college instructor going into the future? The logical conclusion may be that the instructor is there to promote out-of-the-box perspectives, put forth critical-thinking problems for students to grapple with, and lead the student to a deeper understanding of the importance or relevance of a topic. Why simply learn the anatomy of the spinal column and move on, when one could pause to look at the Venus de Milo statue and open a discussion about standards of beauty and the possibility that she was or was not sculpted with a spinal deformity (Andrew et al. 2018)? No one knows the true answer to these sorts of discussions, but the “correct” answer is not the point of the exercise. Future work is necessary to investigate the long-term impact for students being exposed to arts in their science coursework to evaluate the impact, if any, on content retention, capacity for creative thinking, and personal growth.

The Digital Sky is the Limit

Another major point of reflection is the recent forced embrace of the digital classroom and digital conference room in the context of sharing student-produced work. Of course, the idea of databasing student-produced artwork online is not a product of the COVID-19 situation (Thompson et al. 2010b), but many educators were undeniably forced to explore these opportunities when they would not have done so before. For example, the virtual showcase discussed herein would likely not have taken place online if it weren't for the closure of the university to in-person classes.

Advantages of these sorts of e-venues can be appreciated: ease of access, even from home (despite weather obstacles or virus-induced space restrictions), allowing access to a broader audience. For example, the ability to invite colleagues or members of the department/university administration who could easily attend in a virtual format, parents of participants, or inter-institutional collaborators when in-person attendance would be time and space prohibitive. Future work should consider the advantages and disadvantages to hosting symposia with a digital medium.

One major obstacle to incorporating more humanities-based activities into the anatomy classroom is arguably the idea of student buy-in. This notion of student buy-in is a fascinating concept in its own right. In many ways, instructors are concerned about assigning new, unique, or out-of-the-box activities because they legitimately fear students will rebel against them in a whole range of ways, from simply not doing the activity, all the way to actively punishing them in the form of course teaching evaluations (Seidel and Tanner 2013). On the other hand, despite educators believing in and worrying about student buy-in, education psychology does not even have a firm definition for the concept (Cavanagh et al. 2016). It is often difficult to measure the impact of incorporating humanities into the science classroom, as the benefits are potentially abstract to both educators and students alike. If writing a poem about the musculature of the forearm and hand did not improve student exam scores, does that mean the exercise had no value? Most would argue that an activity can have great value, even if it has nothing to do with increasing test scores.

Obstacles to implementation

The notion of merging art and science is a conundrum for some students. In addition to the societal messages that these two disciplines are incongruent, students may have self-limiting beliefs about their own artistic capabilities. Other practical considerations include collecting, transporting, storing and grading the submissions, especially some of the more elaborate creations. These factors are amplified in a large class. The instructor must also decide whether the assignment is part of the grade or has extra credit value, and how the artwork will be shared with the class (if it is shared at all).

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Conclusion

Incorporating the humanities and artistic expression into anatomy coursework is something attainable, manageable and valuable. It can be achieved on any scale, from having students write a single haiku all the way to having them create multiple artistic pieces that can culminate in an art showcase at the end of the semester. Alternatively, instead of having the students create their own art, the study of existing works of art can enhance the student learning experience. The opportunities for incorporating the arts and humanities in the study of the human body are practically endless.

Acknowledgments

The authors would like to express their appreciation to Rachel Maggard and Meredith Harris for their assistance during the 2019 course and in assessing the creative projects for the showcase.

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