

The Art of the Matter: The Importance of using Art in the College Classroom to Promote Creativity and Reinforce Lessons

Ashley R.P. Wellman*

The Citadel, 171 Moultrie Street, Charleston, SC 29409, USA

Abstract: Art is a valuable learning tool, regardless of discipline, that is often neglected in the college classroom. This article describes an artistic group exercise that required students enrolled in a homicide class to illustrate “warning” posters, depicting various explanations for why people kill. The author explores how this innovative group project enhanced a traditional classroom lecture on the same subject. The assignment was replicated for four semesters. Using the results of a post-assignment survey, the author presents student evaluations of the project, including both quantitative and qualitative responses. Students rated the assignment as both enjoyable (average score of 6.42 out of 7) and beneficial to their retention of course material (average score of 6.06 out of 7.0). Based on student feedback, this article serves as a call to higher education professionals, encouraging the implementation of creativity in traditional curriculum. The detailed activity within provides a blueprint that any professors can tailor to fit their given course topic and discipline.

Keywords: Art, classroom activity, creativity, higher education, lesson planning, supplemental assignment.

Children of Any Age Flourish with Options. Art should be Mandatory at All Ages.

-Donna Jo Massie, Artist

INTRODUCTION

Art and creativity are essential parts of the learning process often fostered in early education. While students advance through their education, the inclusion of art and creativity in the classroom tends to fade from the curriculum. However, as artist Donna Jo Massie states, art is a beneficial learning tool regardless of age [1]. Higher learning professionals are tasked with the challenge of maximizing the learning experience and potential of our students. Does incorporating an artistic class assignment into a traditional lecture course stimulate student enjoyment and enhance the students’ perceived retention of course material? Based on evidence from an introductory homicide course assignment, the current article offers an example of how a simplistic art project can enhance conventional lecture ideas, ignite student interest in the topic and improve perceived retention of course material. The described activity can be easily tailored to a variety of disciplines and subject matter in an effort to expand creativity in the college classroom.

A review of academic literature reveals that the use of art and creativity in the classroom enhances students’ academic success. One way to incorporate both of these strategies is to integrate artistic components into the learning process. Scholars across disciplines have provided extraordinary examples of how art can be transformed into educational tools that strengthen student comprehension and inspire individual creativity. These studies are highlighted within the

article. Additionally, the assignment described below serves as a step-by-step example of how the use of artistic and creative activities is possible and important in the college classroom.

This article provides a detailed description of an art project utilized in a traditional lecture course, explores student feedback and provides encouragement that all faculty, despite subject area, can develop successful, creative projects for college students. In Fall of 2009 I developed and taught a new course titled “Homicide”, designed to teach students about homicide through a scholarly and sociological examination of the crime and those who commit such acts. The manner in which I designed the course required that the first several lectures contained rich data, powerful statistics and complex criminological theories to teach students the reasons why people kill. To help transform the static lecture into an enjoyable learning experience, I developed an artistic in-class activity for my students requiring them to illustrate the theories, explanations and criminal defenses discussed. On a large piece of poster board, students created visual illustrations that predominately featured one of the major lecture themes and incorporated written documentation of a relevant historical or current event. This project utilized well established philosophies of active and interactive learning, placing students in small groups to reexamine a topic taught in a traditional lecture format. This exercise also reinforced class material by applying the concepts learned in an innovative and relatable way. After observing success upon the first attempt at this artistic learning exercise, I have incorporated this assignment into the class each semester that I have taught the course since 2009. The four semesters of compiled data (2009-2011) from student feedback are described within. The results demonstrate that an innovative, creative assignment does improve student enjoyment and heightens the students’ view of material retention.

*Address correspondence to this author at the Citadel, 171 Moultrie Street, Charleston, SC 29409, USA; Tel: 843-953-5072; Fax: 843.953.5066; E-mail: awellman@citadel.edu

LITERATURE REVIEW

Today colleges are often seeking dynamic students, aiming to attract those people who possess unique and extraordinary talents in addition to their academic abilities. One of the greatest strengths a student can showcase in their college application is their creativity. However, once the student enters the realm of higher education they are primarily tasked with the memorization of information and begin to lose touch with the very creativity that made them exceptional students from the start [1]. As educators, we are responsible for developing innovative teaching styles in an effort to embrace various skills and learning styles by promoting creativity in the classroom [1]. For many students, creativity is often neglected in traditional collegiate settings. However, research indicates that regardless of age students need motivating and resourceful teachers to capture their attention and generate a love for learning [2-4].

Authors of previous education studies have found that the undergraduate student has a limited attention span that suffers dramatically after the first 10 to 20 minutes of class [5-9]. In addition to making the class more enjoyable, scholars have found that interactive (student engaged) and active (group-related) learning techniques foster increased student motivation and attention, thus enhancing their retention of classroom material [10-15]. Nance and Nance [16] found that students could only recall 5 percent of the material they had learned *via* a lecture on the same day, which indicates a need for additional teaching mechanisms in the classroom. By incorporating creative and artistic learning strategies into traditional lecture based courses, educators can seek to encourage students, engage their interest and improve their overall understanding of material.

In a 2012 study conducted by Munakata and Vaidya [17], students were asked to rate on a scale from 1 to 5 several popular college majors according to the level of creativity, with 5 being the most creative. Overall, the results of this survey found that students view the fine arts as incorporating creativity in the classroom, but that other majors including both hard and social sciences were not very conducive to creativity. These results should cause concern among educators due to the fact that students within every major learn through various learning styles, and that traditional lecture is not the only effective way to meet our students' many needs. Traditional educational research has developed three learning categories that span across discipline, including visual, auditory and kinesthetic learners [18-20]. Therefore, despite our subject area, all higher education teachers should aim to incorporate creative learning strategies into their classroom. It is our responsibility as educators, states Gomez [21] to lead our students to creativity by generating new ideas and instituting innovative processes in all of our classroom lessons.

Incorporating artistic assignments is one way to develop a classroom environment that promotes understanding and learning. Narey [22] makes a bold observation that many people view art as a "break" or "free-time" activity for students that requires little thought and provides a release from the "important" class information. While this is a common misconception, abundant research indicates that art is actually an incredibly beneficial learning tool. According to Gazzaniga [23] the arts strengthen attention, motivation

and understanding. A meta-analysis conducted by Hetland, Winner, Veenema and Sheridan [24] depicted a plethora of studies which provide strong evidence of a positive relationship between student participation in the arts and overall student performance. Just as art can bridge language, cultural, time and space barriers, scholars are learning that art can also be helpful to a classroom of diverse learners [25,26].

Including creativity and the arts into the university classroom is not a new idea. In fact, several scholars have developed projects for their undergraduate classes that allow students to learn a traditional concept through untraditional means. A selection of these studies is summarized below.

An excellent example of utilizing the arts to enhance classroom learning is demonstrated by Diane Barthel [27] who utilized slides of architectural and classical art to illustrate sociological developments. The major goal of her study was to incorporate these visual slides to demonstrate the following historical perspectives: cultural change, concepts of self, rise of the industrial society, urbanism, gender, ethnicity, family and the rise of consumer society. She combined fine art and structural architecture to project a visual progression of sociological history to her students. The students, who did not have a background in fine arts or architecture, were extremely enthusiastic about the use of these images, stating that the slides enhanced the course materials. Barthel also solicited suggestions from the students on how to improve her creative approach to teaching. Students' opinions varied from relating the art and architecture to the everyday life of the time period to using the slides more often with more depth and variety. Through this straightforward incorporation of fine art and architecture into her lessons, Barthel was able to provide students with a better understand of historical, sociological context.

Jarl Ahlkvist [28] provides evidence of the effectiveness of using music to enhance a traditional lecture. Ahlkvist utilized classical progressive rock music to teach students in an introductory sociological theory course. Using the abstract concepts found in popular music, Ahlkvist was able to show students how specific bands often paint ideas of society and relationships much like social theorists articulate human relations and societal realities. This project utilized multiple elements of progressive rock music, from video and lyrics to album covers and musical tones, thus appealing to students various learning styles. Students in one section of the class received this "pop culture" version of the theories, while others received a more traditional lecture. On the final exam, those students who were introduced to the musical theory presentation scored significantly higher on related questions than did the course who received the traditional lecture. This creative approach to teaching clearly aided students' retention of course material.

As previously mentioned, the use of art and creativity should not only be reserved for the social sciences. Introductory mechanical engineering students were exposed to the industrial design process through LEGO building exercises at the University of Nevada-Reno in a study conducted by Wang [29]. A course at the U.S. Naval Academy challenged advanced engineering students to create remote operated vehicles to compete against one another in a competitive basketball game [30]. Students'

performance and instructor evaluations demonstrated that both of these creative assignments allowed students to channel ingenuity and challenged traditional classroom teaching methods.

Munakata and Ashwin [17] required students in mathematics and science to utilize photography as a method of understanding course material. In one exercise, math students participated in a photography contest which instructed each student to take a series of photos and select their best picture. Prior to putting their photo on display, students had to analyze the picture and detail the geometrical concepts that could be found within. In a similar class project, students enrolled in a physics class were told to capture science in the “real world” with photography. In a photograph exhibition, the students displayed their photos along with an explanation of the science they captured with their camera. Munakata and Ashwin were able to reinforce the concepts the students had been taught in the classroom and provided the students with practical examples of the lessons through art.

Pavill [31] developed an exercise for her nursing students which required them to select a patient who they felt had touched their lives the most. In addition to their traditional nursing care programming plans, students were required to develop an artistic representation of how illness had impacted their patients’ close familial relationships. The students created fine art presentations ranging from sculptures and paintings to song compositions and theatrical performances. Student feedback indicated that this unique and creative lesson had allowed them to develop a greater understanding of their clients’ experiences and a better grasp of the course material than any other traditional approach to the topic.

Regardless of medium or discipline, creativity has a place in our higher education system. In addition to student enjoyment, creative and artistic projects in the classroom are beneficial to students’ learning. It is helpful to relate classroom activities to real-life scenarios, as students are motivated to read and learn more when they can link the concepts with specific cases [15]. It is exciting to note that educators can foster critical thinking and decision making skills by allowing students to be more engaged in the learning process, and the current study is another example of how art in the classroom can successfully aid our students.

METHODOLOGY:

Sample

The current exercise has been replicated in four homicide courses that I have taught at two different universities between the years of 2009 and 2011. The two universities included in this study are vastly different, with the first university being a major southeastern liberal arts school comprised of approximately 51,000 students and the second university being a more conservative college with an enrollment of less than 4,000. Despite the differing academic settings, the class lessons, goals and this specific activity have remained consistent. My homicide class is designed as an upper-level elective course for criminal justice majors. A total of 139 students completed the post-assignment survey. Of these students, 55 were female and 84 were male. The

racial composition of the sample included 116 white and 23 non-white students. The average age of the students was 21.05 (min = 19, max = 27), consistent with an upper-level course.

Assignment

One of the primary lessons taught in the homicide course focuses on understanding why people commit homicides in the United States. I scheduled the course to include both a traditional lecture on this subject and a supplemental artistic assignment. First, students were exposed to a two week lecture series on “Why People Kill” which introduced the students to theories, defenses and explanations that have been used in an attempt to understand motivations behind homicide. Upon completion of the lessons, I told the students that our next meeting would provide them with a break from traditional lecture and that they would be completing a group project in class. I requested that students who had laptops on campus bring them to our next meeting. When they showed up for class the following sessions the students were eager to know what the project entailed.

Before the next class period, I was responsible for preparing the activity. This required that I detail the project instructions and create topics from the lecture that the students would be responsible for illustrating. Based on the lecture on reasons people kill, the topics included all previously discussed theories, explanations and defenses. These ranged from the well known positivist and classical theories of crime to the unusual “Twinkie” and “PMS” defense. I typed these ideas and cut them into individual strips so that groups would each be assigned different concepts.

The first day of the activity, students assembled into groups of 2-3 and selected a topic. Once they had their topic, I distributed a piece of poster board and a box of colored markers to each group. As the groups settled I provided the class with instructions: they were to develop a “warning” poster to depict the issue they had selected, using both a visual illustration and a real-life scenario or court case. I created an example of the assignment and showed the class my poster as a template for their own design (See Fig. 1).

WARNING: _____ can kill.
ILLUSTRATION
Fact/Scenario: _____ _____

Fig. (1). Poster layout template.

At the top of each poster the students wrote: “WARNING: _____ can kill”. The students then searched on their laptops for studies or real-life scenarios that depicted how their chosen topic might contribute to murder. The students wrote their fact/story at the bottom of

the poster which was accompanied by an illustration of this scenario (See Fig. 2).

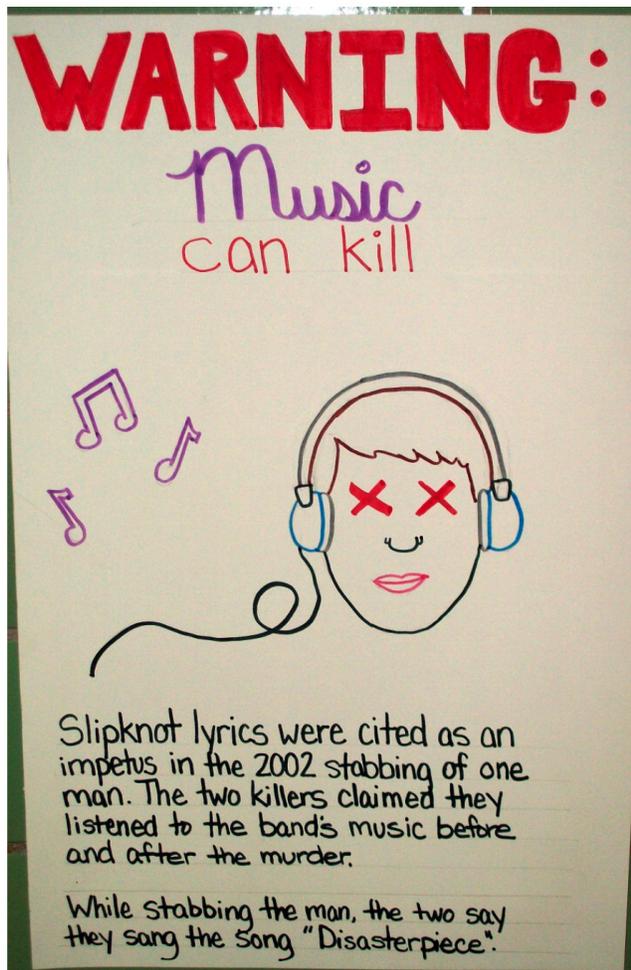


Fig. (2). Poster created by author for students to model.

In the event that a group did not have a computer, they were instructed to share with another group or to utilize the classroom computer. The project lasted for two class periods. Most students found their factual scenario and provided the basic outline of their illustration on day one and completed the coloring phase of the project on day two. After the project concluded, the posters were hung in the main hallway of our department so that the students could examine their classmates' work and other students at the university could have a glimpse into our classroom lessons.

Measurements

It was important for me to gauge the students' experience with this project. After providing students with an description of the survey and reading aloud the oral consent document, I asked the students to complete a voluntary, brief five question survey to evaluate the assignment. First students were asked to rank their level of enjoyment on a scale from 1 to 7, with 1 being strongly disliked and 7 being strong liked (1=strongly dislike, 2= dislike, 3=somewhat disliked, 4=neutral, 5=somewhat liked, 6=liked, 7=strongly liked). Second, students were asked to rank the level in which the assignment improved or reinforced the ideas they had learned in the corresponding lecture, with 1 being

strongly hindered their understanding to 7 being strong improved their understanding of the material (1=strongly hindered, 2=hindered, 3=somewhat hindered, 4=neutral, 5=somewhat improved, 6=improved, 7=strongly improved). The final three questions were designed for the students to reflect on the process. They were asked to describe their favorite and least favorite elements of the assignment and to describe how they felt about having their work displayed throughout the department.

RESULTS

The first two measures were quantitative in nature. Students were first asked to evaluate their satisfaction of this exercise. Students consistently expressed a high level of satisfaction with the project, with the overall average indicating 6.42 out of 7.0. The breakdown of student enjoyment can be seen in Table 1.

The second quantitative measure was to gauge the extent to which students felt this exercise reinforced the ideas originally introduced in the preceding lecture. The students indicated they believed the project had improved their comprehension of the information, scoring the impact of the assignment with an average of 6.06 out of 7.0. All students indicated that the project had, to some degree, enhanced their knowledge. Student feedback on concept reinforcement is detailed in Table 2.

The students were then asked to qualitatively evaluate the project. These responses allowed the students to individually critique the project, offering their favorite and least favorite aspects of the assignment, their opinions on replicating the assignment and their feelings of having their artwork showcased outside of the classroom.

Favorite Aspect

Students commented that this project provided a break from traditional classroom lectures and allowed them to draw on their individual creativity. It was clear that this unconventional project was enthusiastically received by the students. Many students focused on the excitement of creativity in the college environment. For example, one student stated, "In a creative outlet, it allowed me to learn about the bizarre and ridiculous reasons people kill." Another believed the activity enhance student learning by responding "it brought about a desire to think creatively on our own and work with others to produce a better learning environment." Other students described their favorite component of the project as an outlet from higher education monotony. For one student, his favorite part was "taking a break from the lectures and applying information we learned in a new and creative way." Another student emphasized that the project was quite useful by describing the posters as "different than everyday lectures and handouts. It keeps the students alert and minds active with new methods of retaining information."

Least Favorite Aspect

Next, in an effort to improve the assignment in future courses, students were asked to indicate their least favorite part of the project. I was pleasantly surprised to find few students had an element of the project that they disliked. Instead, they noted some of the limitations they experienced,

Table 1. Question 1 Enjoyment Results

*Trial Details	N =	(4) Neutral	(5) Somewhat Liked	(6) Liked	(7) Strongly Liked	Average
Trial 1 (2009)	39	0	3	17	19	6.41
Trial 2 (2010)	42	1	0	20	21	6.45
Trial 3 (2011)	30	1	2	12	15	6.37
Trial 4 (2011)	28	0	2	11	15	6.46
Total	139	2	7	60	70	6.42

*Trials 1 and 2 were taught at "University A", as opposed to trials 3 and 4 which were taught at "University B".

Table 2. Question 2 Reinforcement Results

*Trial Details	N =	(4) Neutral	(5) Somewhat Improved	(6) Improved	(7) Strongly Improved	Average
Trial 1 (2009)	39	2	5	16	16	6.18
Trial 2 (2010)	42	3	7	20	12	5.98
Trial 3 (2011)	30	0	10	13	7	5.90
Trial 4 (2011)	28	0	6	13	9	6.17
Total	139	5	28	62	44	6.06

*Trials 1 and 2 were taught at "University A", as opposed to trials 3 and 4 which were taught at "University B".

including time constraints, lack of confidence in their artistic ability and topic assignment. Examples of students comments included "I wish we weren't limited to one specific topic per group," "The time limit made it harder to produce quality work," and "I have zero art ability." These student concerns are addressed in the limitations section of this article.

Feelings of Having Work on Display

After the posters were completed, they were put on display in the hallways of our department for other students to see. I wanted to gauge how comfortable the students were having their artistic representations exhibited. Students expressed that the showcasing of their projects provided legitimacy to and enhanced pride in their own work.

Some students provided feedback about their personal excitement such as "it made me feel as though my work was meant to be showcased in a fancy museum..." and "I was shocked to see my poster in the hall. I walked past and went... that's MY poster!" Another popular response was that the display helped to illustrate the complexity of homicide. One example of this was a student who wrote "When all the posters were hung together, it surprised me at how many motives there really are for murder." Finally, other students took the time to reflect on how others might view and learn from their work. One student said, "I was really proud, and I think a lot of students liked reading them and will probably want to sign up for our class now." Another commented, "It is good they are on display. It shows this is a serious issue in our society and helps people that aren't even in our class learn about it." Despite many of the students' initial reservations about their level of artistic ability, the students were overwhelmingly pleased that others were able to see what they were learning in class and each took great pride in their posters.

Student Recommendation

All the students involved in this project believed that the assignment should be replicated in subsequent semesters. Their reasons were generally twofold: that the warning posters had allowed them a rare opportunity to utilize their creativity and that the posters strengthened their understanding of the course material. Students' acknowledgments included "I can now think about the posters and remember the theories based on the pictures and scenarios people put on their posters" and "It helps to further reinforce concepts that you taught in class when we physically look at the idea and have to expand on the scenario." I believe that the expression of concept reinforcement was the most beneficial and exciting outcome of this study. The student responses demonstrated that they recognized the educational value of the assignment. Students expressed confidence in recalling the theories and explanations from the "Why People Kill" lecture by visualizing the images and scenarios that their classmates' posters had captured.

LIMITATIONS

It was important for me to solicit feedback about the limitations of this study. Students suggested few revisions to the assignment itself. Instead, concerns about assigned topics, time constraints and students' perceived lack of artistic ability were expressed. These limitations were a product of the constraints and challenges created by a large, lecture based course setting.

When addressing the concern of assigned topics, it is necessary to gauge the professor's need of having all topics in the lesson illustrated. For my course, I presented close to 40 topics to the students in the original lecture, and I wanted to ensure all components of the lecture were included in the artistic element of this study. Based on the size of the

courses at both universities, it would be difficult to allow the students to have the freedom to pick their poster topic. By assigning the topics, I was able to control the assignment in a way that ensured all of the ideas from the lecture would be represented on a poster. However, I did want to provide students with the liberty of interpreting and personalizing their assigned topic. Students were allowed to find their own specific scenario/case that would serve as the example for their assigned concept, thus expanding their creative potential. Smaller classes may be more conducive to allowing students to select their own topics from the lecture.

Time is another constraint in higher education. Depending on how intensive your course and how frequently you have class will determine how much of class time can be dedicated to an assignment of this nature. My homicide course is quite intensive, which makes it difficult to expand this project beyond the initial two class periods allotted for its completion. However, when replicated in the future, it might be helpful to assign the students' topics prior to the day the project begins. This way, the students would have additional time to research the specific example they wanted to illustrate on their poster.

The students were comical about their lack of artistic ability as they designed their posters. I had the students work in groups of two or three students in the hopes that one of the students would feel comfortable assuming the main role of illustrator. A few groups asked other people in the class, including myself, to assist them in their drawings. The team atmosphere was encouraging, and the students expressed great pride in their posters, despite their initial fears of their artistic skill level. Reinforcement and encouragement can be provided to groups to reduce the initial hesitation students might face when asked to complete an innovative, nontraditional project.

Finally, it should be noted that the data within this article demonstrate the perceived impact of an artistic assignment on comprehension and retention of lecture based materials. Future studies should seek to measure the direct retention benefits of supplemental assignments *via* methods such as a pre- and post-assessment or comparison group data. The students' perceptions do however provide scholars with information that these types of assignments are enjoyable to students, and these unique projects have the potential to increase student knowledge. Student perception indicates a willingness and need to learn through a variety of methods, thus demonstrating a place in the college classroom for artistic components of learning.

DISCUSSION

This study quantitatively and qualitatively evaluates the extent to which incorporating an artistic class assignment into a traditional lecture course stimulates student enjoyment and enhances the students' perceived retention of course material. The results indicate that the project provides great benefit to college students by incorporating a variety of teaching methods and learning strategies. Artistic and creative assignments, such as the one described in this article, allow for student engagement, repetition of material, and processing and application of ideas. Each of these pedagogical tools contributes to the students' potential understanding and comprehension of the course material. These interactive assignments provide value to student ideas, allow them to evaluate their understanding and

empower them to take to control of their learning process [3,23].

Results from this exercise reinforce literature that states active and interactive learning strategies increase student attention, interest and retention [10-15, 32, 33] and simply makes learning more fun [35]. More than 93% of the students in this sample (130 of n=139) liked or strongly liked participating in the poster project. While reflecting on their assigned topic, the students expressed that the assignment was not only a break from traditional lecture, but it also provided an avenue for their individuality, kept them alert and provided alternative learning strategies. Specifically, the project required students to recall the ideas from the traditional lecture, process the material, research their specific topic, provide an example of the phenomenon and present their interpretation of the theories/ideas *via* art.

While the current study was not intended to measure direct retention of material, the students' perception was that the assignment offered retention benefits by providing visual examples for recollection. More than 75% of the students (109 out of n=139) reported that the project improved or strongly improved their understanding and retention. The pictures and scenarios the students provided to exemplify their chosen topics provided a way for students to remember the information. These results are consistent with established scholarly literature that indicate the arts and innovative activities strengthen the students' learning [10, 11, 24, 32-34].

The final component measured in this study was the student reaction to having their artwork displayed after sharing their creation with the class. By assigning a different theory or topic to each small group of students, posters enabled the students to develop a level of expertise on their chosen subject. Upon completion of the poster, they were able to share what they learned with other students in the classroom. In the process of sharing their poster with the class, they were effectively teaching their peers about the subject, thus reinforcing the lecture material, emphasizing their own familiarity on the issue and heightening their peers' knowledge [35]. The posters were then displayed in the departmental hallway for other students and faculty to observe. Students stated they felt proud of their work, enjoyed knowing they could teach others about our class topic, and that they could bring attention to a topic that otherwise might not be explored. Similar to a young child who finds joy in an art project displayed at home on the refrigerator, displaying student work, regardless of age, can foster a similar joy for learning and a sense of personal pride in the work they produced [36].

Overall, students expressed an overwhelming support for alternative, artistic assignments in the classroom. Results demonstrate enjoyment and significant benefit from allowing students to tap into their creativity, originality and individuality. The students' personal reflections on the project indicate that incorporating the arts into traditional college lectures does increase student enjoyment and heighten the students' feelings of understanding the course material.

CONCLUSION

This project demonstrates the importance of creativity and the need for the utilization of unconventional teaching tools in the university classroom. The artistic assignment I created highlights the criminological defenses, theories and explanations as to why people kill originally delivered *via* a

traditional lecture. This specific assignment holistically exposed students to the information by incorporating auditory, visual and kinesthetic learning styles. The basic concept of having students illustrate and elaborate on the key lessons taught during a conventional lecture can be applied to a wide variety of disciplines and subject matter. The students that participated in this study expressed great interest in the project, indicated the reinforcement of ideas and detailed a strong desire to see assignments like this replicated in the classroom. Regardless of discipline or environment, the idea behind this assignment can be easily replicated. As demonstrated by this study and previous literature, we know projects that allow students to explore ideas and generate examples aid in their personal retention. Illustrating the concepts in an artistic format and displaying students' works affords other students on campus the chance to gain from the project as well. I challenge my colleagues to embrace art and creativity in the realm of higher education. Together, we can share our innovative ideas and successes in an effort to ultimately improve the way in which our students learn and comprehend information at the college level.

CONFLICT OF INTEREST

The author confirms that this article content has no conflict of interest.

ACKNOWLEDGEMENT

Declared none.

REFERENCES

- [1] Massie DJ. The painter's keys community: Clickbacks. [Internet]. 2004. Available from: <http://www.painterskeys.com/clickbacks/elegance.asp> [cited 2012 May 21].
- [2] Johnson DW, Johnson RT, Smith KA. Cooperative learning: Increasing college faculty instructional productivity. Final Report. George Washington University, School of Education and Human Development. Report No. 4. Washington, DC: ASHE-ERIC Higher Education 1991.
- [3] Kaur D, Singh J, Seema, Mahajan A, Kaur G. Role of interactive teaching in medical education. *Int J Basic Appl Med Sci* 2011; 1(1): 54-60.
- [4] Sorcinelli MD. Research findings on the seven principles. In: Chickering A, Gamson Z, Eds. *Applying the seven principles for good practice in undergraduate education*. New Directions for Teaching and Learning. San Francisco: Jossey-Bass 1991; pp. 13-25.
- [5] Burns RA. Information impact and factors affecting recall. Paper presented at Annual National Conference on Teaching Excellence and Conference of Administrators: Austin, TX 1985.
- [6] Foley RP, Smilansky J. *Teaching techniques: A handbook for health professionals*. New York: McGraw Hill 1980.
- [7] Frederick PJ. The lively lecture: 8 variations. *Coll Teach* 1986; 34(2): 43-50.
- [8] Johnstone AH, Percival F. Attention breaks in lectures. *Educ Chem* 1976; 13: 49-50.
- [9] Stuart J, Rutherford RJ. Medical student concentration during lectures. *Lancet* 1978; 8088: 514-6.
- [10] Bonwell CC, Sutherland TE. The active learning continuum: Choosing activities to engage students in the classroom. *New Dir Teach Learn* 1996; 67: 3-16.
- [11] Curry RH, Makoul GE. An active learning approach to basic clinical skills. *Acad Med* 1996; 71: 41-4.
- [12] Gage NL, Berliner D. *Educational Psychology*. Dallas: Houghton-Mifflin 1991.
- [13] Mannison M, Patton W, Lemon G. Interactive teaching goes to Uni: Keeping students awake and learning alive. *High Educ Res Dev* 1994; 13: 35-47.
- [14] Meyers C, Jones TB. *Promoting active learning: Strategies for the classroom*. San Francisco: Jossey-Bass 1993.
- [15] Steinert Y, Snell LS. Interactive learning: Strategies for increasing participation in large group presentations. *Med Teach* 1999; 21: 37-42.
- [16] Nance JL, Nance CE. Does learning occur in the classroom? *Coll Student J* 1990; 24: 338-40.
- [17] Munakata M, Vaidya A. Encouraging creativity in the mathematics and science through photography. *Teach Math Appl* 2012; 10:1-12.
- [18] Conway MC, Christiansen MH. Modality-constrained statistical of tactile, visual and auditory sequences. *J Exp Psychol* 2005; 31: 24-39.
- [19] Dunn R, Beaudry JS, Klavas A. Survey of research on learning styles. *Cal J Sci Educ* 2002; 2: 75-98.
- [20] Lujan HI, Dicarolo SE. Too much teaching, not enough learning: What is the solution. *Adv Physiol Educ* 2006; 30: 17-22.
- [21] Gomez JG. What do we know about creativity? *J Eff Teach* 2007; 7: 31-43.
- [22] Narey MJ. Chapter 12: Learning to see the boa constrictor digesting the elephant: Pre-service teachers construct perspectives of language, literacy, and learning through art. In: Narey MJ, Ed. *Making meaning: Constructing multimodal perspectives of language, literacy, and learning through arts-based early childhood education*. New York: Springer 2008.
- [23] Gazzaniga M. Arts and cognition: Findings hint at relationships. Final Report. The Dana Consortium Report on Arts and Cognition, New York, Washington, DC: Dana Press 2008.
- [24] Hetland L, Winner E, Veenema S, Sheridan KM, Perkins DN. *Studio thinking: The real benefits of visual arts education*. New York: Teachers College Press 2007.
- [25] Bresler L. Agenda for art education research: Emerging issues and directions. In: McCarthy M, Ed. *Enlightened advocacy: Implications for research for arts education policy and practice*. College Park: University of Maryland; 2010. pp. 3-71
- [26] Bresler L, Ardichivilli A. *International research in education*. Dordrecht: Springer 2002.
- [27] Barthel D. Using art and architecture slides in sociology. *Teach Soc* 1987; 15: 21-6.
- [28] Ahlqvist JA. Sound and vision: Using progressive rock to teach social theory. *Teach Soc* 2001; 29: 471-82.
- [29] Wang E. Teaching freshman design, creativity and programming with Legos and Labview. Proceedings of the 31st ASEE/IEEE Frontiers in Education Conference 2001; Reno, NV, pp. F3G-11-F3G15.
- [30] Dwan TE, Piper GE, Wick CE, Bishop BE. System ball: a creative capstone design experience. Proceedings of the 31st ASEE/IEEE Frontiers in Education Conference, Reno, NV 2001; pp. F3G-3.
- [31] Pavill B. Fostering creativity in nursing students: a blending of nursing and the arts. *Holist Nurs Pract* 2011; 25:17-25.
- [32] Perry N, Huss M, McAuliff B, Galas J. An active learning approach to teaching the undergraduate psychology and law course. *Teach Psych* 1996; 23(2): 76-81.
- [33] Watson D, Kessler D, Kalla S, Kam C. Active learning exercises are more motivating than quizzes for underachieving college students. *Psychol Rep* 1996; 78(1): 131-4.
- [34] Lawson T. Active learning exercises for consumer behavior courses. *Teach Psych* 1995; 22(3): 200-2.
- [35] Robinson MB. Using act learning in criminal justice: twenty-five examples. *J Crim Educ* 2000; 11(1): 65-78.
- [36] Block CC, Oakar M, Hurt N. The expertise of literacy teachers: a continuum from preschool to grade 5. *Read Res Q* 2002; 37: 178-206.