Discovering Physics in an Art Museum

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Abstract

Beginning Academic Year 2006-2007, De La Salle University (DLSU) implemented the Lasallian General Education Curriculum -- "a set of foundational, formative, and integrative courses intended to inculcate in students a critical appreciation of the diverse fields of human knowledge, their principles and science, and their arts and methods of inquiry" (from the Preamble of the General Education Curriculum). In this pedagogical framework, students are exposed to various modes of learning, with the view of deepening their appreciation and understanding of the subject matter. During Academic Year 2009-2010, the "Istruktura, Iskultura" (Structures, Sculptures) art exhibit at the DLSU Museum provided students taking up their General Education Science Course in Materials Science (Physics Track) [SCIMATP] with an opportunity to relate their learning in Physics with real-life works of art. The paper presents excerpts from the essays written by the students in the SCIMATP course. They were asked to write about their experience during the Museum visit, specifically on "what elements of the mechanical properties of materials did they see in the art pieces on display". Building on the positive response of the students in the SCIMATP course, the paper presents how art can be integrated in science courses in the Lasallian General Education Curriculum.

Keywords: Transformative Learning; Physics; Art Museum; General Education Curriculum

1. Introduction

During Academic Year 2006-2007, De La Salle University, a private higher education institution in Manila, Philippines, began implementing the Lasallian (General Education) Core Curriculum. This new curriculum consists of a set of foundational, formative, and integrative courses that aim to *"develop in students a critical appreciation of the diverse fields of human knowledge, their principles and science, and their arts and methods of inquiry"* (Rapatan, et.al., 2005). The Lasallian (General Education) Core Curriculum is rooted on a transformative learning framework – a process of acquiring knowledge by synthesizing what is known with something that is not known through questioning assumptions, beliefs, and values and by considering multiple points of view, while always seeking to verify truth and reason. This process aims to transform a student's beliefs, attitudes, and emotional reactions by providing opportunities for the student to critically reflect on his/her learning experiences.
The Lasallian (General Education) Core Curriculum aims to expand the students' critical and creative thinking skills by engaging the students in various modes of inquiry. In the new curriculum, students are envisioned to develop knowledge as a result of their inquiry, action, and experimentation. Included in the core curriculum is a six-unit science component that fulfils the requirements of the General Education program.

During Academic Year 2009-2010, I had the opportunity to teach the General Education Introductory Course on Materials Science (Physics track) to two sections of LIA-COM students. The DLSU Core Curriculum approaches the teaching-learning process from a wide variety of modes including "learning by acquiring and understanding knowledge in the various disciplines ... by exploring the relationships among the different disciplines". Two disciplines that would seem worlds apart would be art and physics, and I thought it would be a good experience for my students to integrate concepts they have learned in the Materials Science / Physics class with their appreciation of works of art. The DLSU Art Museum provided us with a very interesting exhibit to work with to supplement the students' research work on mechanical properties of materials and to enrich the in-class discussion of materials that exhibit such properties. During July to December of 2009, sculptures from the Wili and Doreen Fernandez collection, plus additional works from artists (including some National Artists) and private collectors were put together for the exhibit, *"Iskultura, Istruktura: Ideas in Mass & Form"*.

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Upon consultation with the University's Museum Curator, we agreed that the following guide questions would allow the students to reflect on their experience during the Museum visit:

(a) Which work of art did you appreciate / enjoy (interested you) the most?
(b) What is the artist trying to communicate through this work of art?
(c) What emotions did the work of art evoke in you?
(d) What mechanical properties did the artist work with?

The first question gives the student something to focus on, the second question probes the student's cognitive impression of the work of art, the third question elicits the affective / emotional response of the student, while the last question aims to integrate Physics concepts with the student's experience during the Museum visit.

2. Art in Physics, the Physics of Art

In their reflection papers, the students shared their initial thoughts upon learning that the class will visit the Museum as part of the module on mechanical properties of materials. While Benz writes, *"I was initially surprised when I heard that we were to conduct a class in the DLSU Museum"*, there is anticipation in Sophia's thoughts, *"Growing up, I wasn't used to visiting museums except during field trips in school. My family rarely gets involved in matters of art, [thus] I wasn't exposed to such beautiful artistic creations. I felt privileged when I found out that our school has a museum and we have the opportunity to visit the place for our SCIMATP subject"*. The sculpture that most of the students found fascinating / intriguing (and thus they were drawn to it) was Agnes Arellano's ***Dea***. Olivia Sylvia describes their encounter with this artwork, *"My blockmates and I stood, mouths agape, at this shocking representation of motherhood"*.

The students' initial impression of 'wierd' and 'disturbing' changed when they discerned what message the artist was trying to convey. Cassandra synthesizes her classmates' thoughts when she writes, *"The artist tried to communicate the struggles of being a mother and a wife... This sculpture was a fantasy self-portrait from a cast of her face and body... Having four children, three being her stepchildren and one of her own, her sculpture had four pairs of breasts... She showed her feeling of burden and hardship depicted by the angel wings tied down in her sculpture"*. Benz interpreted the breasts as *"the representation of a mother's duty to provide for her children"* and this made him realize *"how our mothers have done so much for their children, giving everything they have just to give their children a fruitful life"*. Isabella and Therese affirm this realization, saying that the artwork evoked a *"deeper and greater appreciation for my mother"*. Aissa took a different route in presenting how she felt the artist portrayed motherhood, *"I did not enjoy this artwork... it evoked too much pain and suffering from motherhood that it displeased me – to the point of even discouraging me from being a mother. In my opinion, despite all the suffering, motherhood and marriage is something fulfilling in the end. I believe that as a mother, because you love your family and your children, you shouldn't see these heavy loads as a burden, instead a sacrifice for love"*.

Agnes Arellano's ***Dea*** (1995)
(images courtesy of www.agnesarellano.com, used with permission)

April highlighted another aspect of Arellano's work, *"Her face exhibits cracks as if something is trying to escape. It's her probably, trying to come out of her self. It's someone struggling to emerge from a dreadful situation, someone who wants to be seen because she knows that she could be so much more"*. This aspect of ***Dea*** inspired Katrina to *"promote my being and self as a woman"*.

In integrating the Physics concepts to her chosen work of art, April writes, *"The mechanical property seen in Arellano's work would have to be hardness; you could really observe that the sculpture exhibits a firm foundation from where it stands and how the structure appears to be solid"*.

In the article entitled *"Roaring Tigers, Desperate Dragons in Transition"*, Apinan Poshyananda (1996) writes,

> "Agnes Arellano's life-size body casts have decidedly ambiguous connotations. Her strange and compelling trinity of Dea, Lola & Vesta (1995) represents the nude women as mothers, Marys, and mythological creatures, and reflects the artist's desire to explain the apparent conflict between ideologies and beliefs...
>
> The central female figure, Dea, is actually a fantasy self-portrait in the posture of the Buddha seated in meditation and sheltered by Muchalinda. This image was inspired by Buddha statues similar to those in the Rockefeller Collection at the Asia Society. The feminized figure has multiple breasts like Mebuyan from the underworld, whose body is delicious with milk glands. Between her legs is a female cobra with open hood, erect like a phallus. Her skin is turned inside out like that of a snake in the process of molting. Her arms have metamorphosed into wings which are folded and clipped. The image becomes a deification of self/mother/goddess, who, as Arellano describes her, "is repressed and gagged" by motherhood."

Two art pieces created by Ral Arrogante caught the students' interest – ***Running the Bull*** and ***Kariton***. Raphaelle writes, *"Those two sculptures were mostly made of copper and brass. It was like junk art and I really appreciated them because they were different from other artworks. They were unique"*.

Mia describes ***Running the Bull*** in terms of the mechanical properties present in the sculpture, *"The artist worked with several mechanical properties... ductility, which he showed in the poles that he slightly bent and deformed to make them look real. He also worked with malleability wherein he hammered some [parts of the] metal to make the copper wire look out of shape. I was also able to observe tension he created wherein the matador's hands were hanging on to the poles which created a force acting on each other"*, and Penny adds, *"corrosion is also applicable because some of its metal has rusted"*.

When asked what attracted them to the artwork, ***Running the Bull***, Denise responded with,*"I liked this artwork the most for it showed complexity and yet the first thing that popped into my head was the word FUN"*. *"When you look at it closely, you can feel a light aura of the sculpture... I think in some ways, the artist is trying to say that life is full of surprises and enjoyment"*, says Penny.

A similar light mood is present in the work, ***Kariton***, Simone describes it as *"a playful artwork"*. *"It expresses a happy emotion, like that of a child"*, writes Margarita. Claire explains the mechanical properties she observed in the artwork, *"The artist used compression and tension to make the artwork have a close depiction of a kariton (cart) used in selling food on the streets. He also showed that he knew of tensile strength because even though some of the copper and brass used were already thin, the wires did not break"*.

The Museum activity was successful in achieving the objective of finding the connection between art appreciation and Physics concepts as seen in how students described Ramon Orlina's work, ***In a Loving Mother's Arm***. Combining the mechanical properties with her cognitive impression of the artwork, Irene writes, *"The use of glass, with its properties of hardness and toughness, as the medium for this artwork symbolizes the unbreakable and strong love of every mother toward her children"*. Monica describes how she felt about the Museum visit, *"All in all, the tour of the Museum was fulfilling. I was able to appreciate the pieces of art and try to see the science part of it"*.

After going through the experience, what do the students say? Students who were initially not expecting much from the activity like Beatrice realized that *"surprisingly, I did find a number of interesting things around. Over-all, our class in the Art Museum was better than I expected it to be. The art works were great and many of them really did connect to me"*.

The parting thoughts of Penny show that the students are in high spirits after the Museum visit, *"To sum up, I am happy that I got the chance to visit it [the Museum]. I really enjoyed looking at the beautiful artworks, and I have developed my interpretation skills through the artwork"*.

The Museum activity intensified school spirit, as Penny points out, *"It is really nice that our school has a museum inside the campus... I think it is something that we should be proud of"*.

Franceska joins Penny in inviting students to make the most of the DLSU Art Museum, *"I hope that the DLSU students will visit the museum and appreciate all the artwork there"*.

Aside from strengthening school spirit, the activity instilled pride in being Filipino. Students like Marian, Michelle, and Khrismae saw the activity as a *"chance to appreciate the artworks of Filipino artists"* thus, deepening their appreciation of Filipino art and culture. Sarah and Sharmaine highlighted the *"creativity of the Filipino artists as seen through their different creations"*.

3. Synthesis

Drake (1993) espouses the use of "transdisciplinary curricular design approaches" that is rooted in the belief that students make better and longer lasting connections between subjects by examining real life situations. By putting emphasis on meaning and relevance through a life-centered approach, knowledge is explored as it is embedded in a real-life cultural context. Krug and Cohen-Evron (2000) notes that educators have used the arts as resources to illustrate various forms of knowledge, to clarify particular subject matter, or to enhance some skills. Ideas and processes can be made concrete for students through an artist's representation. The arts function to stimulate students' multisensory perceptions. The Museum activity in the Physics / Materials Science class has shown one way of exploring the connection between art and science. It is the hope of the author that this sharing would encourage science teachers to explore how they can integrate art in their science classrooms.

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5. References

Drake, S. (1993). Planning integrated curriculum: The call to adventure. Alexandria, VA: Association for Supervision and Curriculum Development.

Krug, D.H. and Cohen-Evron, N. (2000). Curriculum Integration Positions and Practices in Art Education, Studies in Art Education, 41(3), 258-275

Poshyananda, A. (1996) Roaring Tigers, Desperate Dragons in Transition in Tradition / Tensions: Contemporary Art in Asia, New York: Asia Society Galleries

Rapatan M., Zamora, M., Malabanan, O., Limjap, A., Razon, L. and Mistades, V. (2005) "Towards a Lasallian Pedagogical Framework of Transformative Learning", De La Salle University, Manila.