

THE IMPORTANCE OF INTERDISCIPLINARY ART TEACHING:

Reflections on Chinese K-12 Art Education

*A Master Thesis in Art and Design Education in
Teaching and Learning in Art and Design
RISD 2022*

Shixin Zhao

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THE IMPORTANCE OF INTERDISCIPLINARY ART TEACHING:

Reflections on Chinese K-12 Art Education

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ABSTRACT

Central to this thesis investigation is the premise that interdisciplinary art is important for children and youth, especially in the context of Chinese art education. Designed to investigate a movement in art education beyond traditional boundaries, this investigation manifests in four stages of research and concludes with a teaching philosophy for the Chinese school system.

First, the author explores the current state of traditional art classes in China, along with the issues and challenges faced by current art educators. Second, with the objective of creating a positive model built on clear conceptual and practical tools, art integration and interdisciplinary art education within US education are

examined in a literature review. Third, She surveys educators from K-12 in Dalian, China. In this survey, data is collected about traditional art classes in China, the perception and essential components of interdisciplinary art teaching, and the strengths and shortcomings of the Chinese education system. Fourth, in order to gain the competency required, the author explores her own personal teaching practice of designing an integrated and interdisciplinary curriculum, and artistic experiments in the two contexts in the United States. This thesis concludes with the creation of a working philosophy born from multiple experiments with a range of students in various spaces and artistic practice in the United States.

CHAPTER 1

MINI MEMOIR & RESEARCH QUESTION

“I was inspired by the opportunity to merge my skills in technology with hands-on activities and concept-based exploration. Additionally, art helped me manage a tough time in my life, with opportunities to reconcile with my interior life.”

Shixin Zhao

JOURNEY FROM ENGINEERING TO ART AND DESIGN

1.1

Traditional Chinese Art Classes

Chinese art teachers are guided by the national standards for the activities of art classes and the content of curriculums, which are mainly around drawing, craft work, and art appreciation (Piscitelli, et al., 1999). Fine arts and calligraphy are normally introduced in elementary school to serve as a supplement instead of the emphasis for the grade one to three curricula (Ashmore, 1997). It is noted that Chinese traditional painting and calligraphy are more widely emphasized than modern and contemporary art in elementary art classes (Gao, 2019). Students get used to learning drawing techniques by following the rote approaches in copying line by line from drawings, which are found by teachers or exist in the textbooks (Jolley & Zhang, 2012). Based on the long history of art education in China, conventionalized teaching pedagogy has developed (Moffett, 202), in which much more focus is put on improving students' skills and abilities of art expression, while their emotional expressions and creative thinking are neglected (Jolley & Zhang, 2012). However, fewer craft projects are involved in art classes and the pedagogical

practice of “craft” is unimaginable, which means students are merely taught to make images using other materials instead of paints and then make models by plasticine or clays (Carlisle, 1989). Few teachers can truly provide an art class that is a space for students to solve the problems and gain abilities by the collaboration of both minds-on and hands-on experience (Carlisle, 1989).

In Chinese traditional art classrooms in both primary and secondary schools, the elements of community-based learning have been emphasized in art curriculum for more than seven decades (Luo & Lau, 2020). Community-Based Art Education (CBAE) aims to help students build the connection between their visual art learning and their life experience that enhances their sense of social identity and contextual understanding of art and culture (Luo & Lau, 2020). Serving as the guidelines for Chinese art education, CBAE has been published in the National Standards of Visual Arts and provides art teachers with information about lesson content, curriculum design at schools (Luo & Lau, 2020). According to the communi-

ty-based elements in the National Standards for Visual Art, it shows that the component of art teaching has changed a lot in China since 1950. In recent years, with the popularity of modern culture and the relatively neglected indigenous local art and culture, schools have integrated these local elements into the art curriculum in order to enhance students' learning experience (Luo & Lau, 2020). With the increasing art funding at school settings, more consideration has been taken into teacher recruitment, teaching evaluation and curriculum reconstruction.

Memories of Formal Art Classes

Growing up in China, I received a traditional education, which placed arts education in a tenuous position, where art has been considered as a kind of interest subject, but not a necessary part of education. When talking about art education or/ and art teachers, I intuitively attempted to recall my memory as a student in public schools, dating back from primary school to high school. However, I was unable to recall any art teachers or classes. I could only

think of something obscure that I made like cutting paper figures or drawing in class. What left a deep impression on me was that art classes were always being replaced by core disciplines. The reason always was that core disciplines are much more important, and time should be allocated to learning them instead of “playing” in art classes. This attitude was exacerbated by the ever-increasing emphasis on standardized tests and STEM subjects in reading, language, science, technology, engineering, and mathematics.

During art classes, we were asked to complete assignments from other subjects. At first, we were sad with many complaints because we desired a break from boring assignments and to have fun in art class. However, with this situation happening again and again, we became used to taking advantage of the art classroom as a time for finishing core subjects. Gradually, we felt art was not a mandatory subject and was not useful as other subjects.

Potential Influence From Cross-disciplinary Teacher on Art Education

Although I can hardly remember any formal art classes in my schools. I would like to mention my appreciation for the Chinese teacher at my primary school who influenced me. She encouraged us to watch news every day and record them in our journals, aiming to develop our expression skills and broaden our horizons. She also expected us to design this journal as an artbook and decorate it with whatever we liked. I enjoyed the process of creating the journal, during which I could put myself in a private space where my emotion and the connection with the world could be expressed authentically.

In my early childhood, I was fascinated about collecting all kinds of sundries, including stickers, stationery, pen cores with different patterns, package papers, shopping bags, cans and bottles, magazines, shells and stones, leaves, beauty accessories, cards, gifts, etc., and categorizing them into various boxes. I treated them as treasures and always enjoyed sharing stories behind each collection with my parents and friends.

During the practice of making this journal, I tried to tailor some photos that interested me from magazines and stuck them on my journal. At that time, I had no idea about collage, but I was just curious about the integrated picture that was formed by bringing different pictures into one platform. Besides, I also gained the opportunity to re-organize my previous collections and explore more interesting findings.

Memories of Extracurricular Art Class

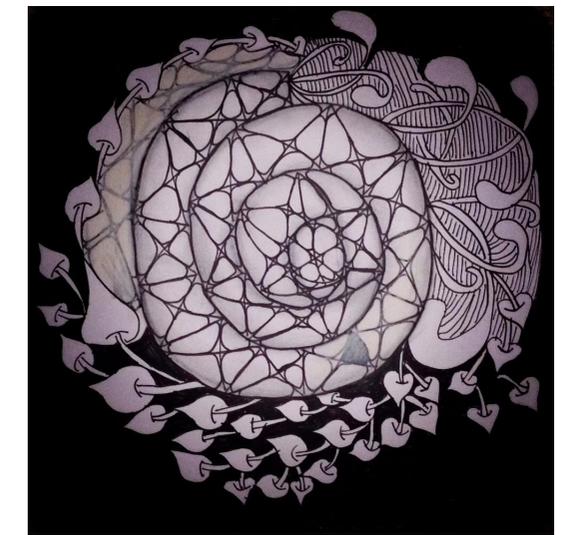
I started drawing randomly on my journal book by copying and making alternatives from the original artworks. Gradually, I felt that I enjoyed drawing and then took an extra curriculum sketch class during vacation before entering high school. I spent about a year and a half learning foundational elements such as line styles, brushstrokes, and shapes. I practiced these techniques repeatedly to achieve the standard recognition by my teacher, but I lacked thinking creatively. I suspended this art class before entering 3rd year of high school because I needed abundant time to prepare for the entry exam and also found the class was boring and different from what I expected. However, I kept drawing based on my own interests and started learning zentangle, which is a relaxing and meditative way of creating images with several patterns (What Is It?, 2003).



FIGURE 1. Zentangle practice



FIGURE 2.3.4. Zentangle practice



Issues and Challenges of Chinese Art Education

“School as factory” versus “School as Studio”

Piscitelli, et al. (1999) stressed two important elements of Chinese art history and art education, which are “strong tradition of fine arts and calligraphy in Chinese culture and the lack of outside influence on Chinese artistry until relatively recently” (p. 26). However, the technical proficiency in previous calligraphy masterpieces is unlikely to go beyond, resulting in the inhibition of today’s art education innovation (Piscitelli, et al., 1999) and artists’ minds and vision have been controlled because of the “decades of ideological restriction” (p. 26). The two different approaches in education in the United States and China are the “school as factory” and the “school as studio” (Steven, 2002) respectively. The former one, seeing education as assembly lines (Upitis, 2004), tends to develop students to be ready for the workforce, contributing to producing better products and a better society (Steven, 2002). In early childhood art education, teachers emphasize much

more on following specific standards and expect young children to achieve artistic skills like adult masters as soon as possible (Piscitelli, et al., 1999). Children are always directed by teachers to choose the topic and composition of their artworks and receive excessive information about technique, resulting in the loss of creativity (Zhu, 1997, personal communication, as cited in Piscitelli, et al., 1999).

However, the latter idea suggests that students should be encouraged to explore things for themselves instead of “putting them into a given path and compelling them to walk there” (Dewey, 1906, as cited in Steven, 2002 p. 283).

“Core subjects” versus “Non-Core Subjects” class

Shi (2021) introduces the definition of core (Chinese, Math, English) and non-core subjects (Arts, PEs, Music) in Chinese curriculum teaching, which is classified based on whether the subjects will be assessed in the entrance examination. “Even today, when more emphasis is placed on student diversification and independent development, some schools are still unable to innovate the class management model to fear affecting the school’s enrollment rate” (Shi, 2021, p.995). It is true that the education mechanism in China is changing, and schools are trying to focus more on non-core subjects that promote students’ overall development both mentally and physically. Challenges rooting from the exam-oriented education system exist (Shi, 2021) and several issues in the current situation of Chinese traditional art class in Chinese public schools (Gao, 2019). It involves the shallow embedded curriculum, less class hours, and simple teaching methods (Gao,

2019). Piscitelli, et al. (1999) also mentioned that the limitation of materials and resources for children’s art classes has affected the possibilities of children’s experiences and explorations in art making. Since there is limited time for art classes, it is hard for students to have a deep comprehension of the local art and build the connection with their living experience (Luo & Lau, 2020). It is noted that Chinese traditional painting and calligraphy are more widely emphasized than modern and contemporary art in elementary art classes (Gao, 2019). The concern about preserving the local culture and art and counteracting the globalized and urbanized art (Luo & Lau, 2020) results in considering the proper combination and integration of these two forms of art when designing the curriculum (Gao, 2019).

“Teacher-Centered” Art Class

In schools where students are provided with less freedom to move, to ask or to express themselves, teachers are seen as the center (Pine, 2012). Art teachers tend to follow the content of the official textbook for their classes instead of developing some inquiry-based projects (Luo & Lau, 2020) to fulfill students’ interests. Few teachers could create the art class where students are engaged in playing, exploring and learning to use the skills in problem-solving (Carlisle, 1989). However, it is less likely for textbooks that were published officially to involve diverse content including “different ethnicities, and different rural or urban conditions in different places in China” (Zhang, 2000, as cited in Luo & Lau, 2020, p. 454), which leads to “loss-esteem among students with ethnic minority and rural backgrounds” (Luo & Lau, 2020, p.454). Facing the increasing emphasis on high scores for examinations, Chinese teachers prefer to spend much time teaching exam-oriented curriculum at a fast pace and with no

break. However, students are provided with less opportunities to get engaged by using hands-on practice and allow students to express their curiosity (Pine, 2012).

Chen (2012) mentioned that academic achievement is the only measurement to select the qualified art teacher, resulting in the lack of creativity and motivation in teaching. For art teachers who come from rural areas, it is even more difficult for them to have a deep understanding of the community culture and to integrate it into their teaching pedagogy (Vaughan et al. 2017). Compared to the art teachers from economically advanced cities, less formal training and lack of resources has been received by art teachers from rural areas, which affect their curriculum development to some extent (Luo & Lau, 2020).

Experiences of Integration of Engineering and Art

For my undergraduate study, I spent two years at University of British Columbia, majoring in wood product processing. Although what I mainly focused on was engineering and science, I realized that wood was a maneuverable material which can be manufactured and turned into various possibilities. I also completed several projects by using wood as raw materials and combining other techniques and procedures.

To be specific, I converted the IKEA Bekvam footstool to this customized work “Living in the space” (Fig.6) by sanding, drawing, engraving, staining, finishing, and assembling. The customized nightstand was made by veneering the headboard based on AutoCAD design and manufacturing raw materials on specific machines (Fig.7). The last picture shows a Multi-functional “Octopus” table that was designed for children by inverting code from CAM software to the real machine based on organized contours in the program (Fig.8).



FIGURE 5. Footstool “Living in the space”



FIGURE 6. Nightstand Design



FIGURE 7. "Octopus" Table for Children

Actually, I was really inspired by these engineering-based projects, resulting in the notion that I would like to explore the interdisciplinary studies of art and other subjects. The questions that came up in my mind were:
How can various materials be integrated into art making and how do people with different backgrounds, especially ones who had less or no arts background become inspired to get involved into art education?



FIGURE 8. AR Based Project "The Feast"

Interdisciplinary Workshops

To initiate this research, I joined workshops at a local art education institution, where students with different backgrounds gather together. In the first workshop, we used Zhongshan Square located in Dalian as a site. Our explorations began with an invitation extended to each member of the group to research the social and historical relevance of the prominent star formation that defines this center point in the city. From these accumulated findings, we shaped a collaborative response blending a range of tools and techniques, from AR (augmented reality) to coding, 3D modeling and animation.

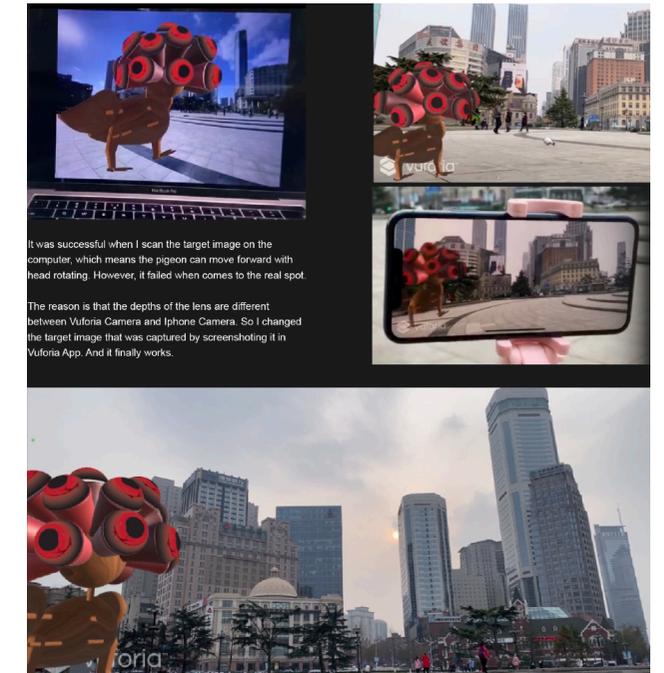


FIGURE 9. AR Based Project "The Feast"

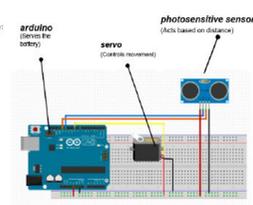
TECHNICAL SUPPORT

Fritzing and Arduino were used to realize circuit connection and coding.

```
#include <Servo.h>
Servo myServo;
// distance pin 2 has a pushbutton attached to it. Give it a name:
int distanceSensorPin = 8;

// the servo motor runs once when you press reset:
void setup() {
  // initialize serial communication at 9600 bits per second:
  Serial.begin(9600);
  // make the pushbutton's pin an input:
  pinMode(distanceSensorPin, INPUT);
}

// the loop routine runs over and over again forever:
void loop() {
  // read the input pin:
  int distanceDetected = digitalRead(distanceSensorPin);
  if (distanceDetected == HIGH) {
    Serial.println("CM");
    myServo.write(180);
  } else {
    myServo.write(0);
  }
  // print out the state of the button:
  Serial.println(distanceDetected);
  delay(1); // delay in between reads for s
}
```



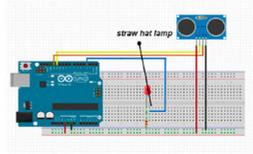
The subtle movement will happen based on distance of sensor and audience.

```
int brightness = 0;
int fadeAmount = 10;
int trigPin = 12; //Trig
int echoPin = 13; //Echo
long duration, cm;

void setup() {
  Serial.begin(9600);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(3, OUTPUT);
  //delay(30);
  int brightness = 0;
}

int getCM()
{
  digitalWrite(trigPin, LOW);
  delayMicroseconds(5);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  cm = (duration / 2) / 29.1;
  return cm;
}
```

```
void loop() {
  cm = getCM();
  Serial.println(cm);
  brightness = 0;
  analogWrite(3, 0);
  for ( ; brightness <= 225 && cm < 70; brightness++)
  {
    cm = getCM();
    analogWrite(3, brightness);
    delay(30); //change
    brightness = brightness + fadeAmount;
    if (brightness >= 255) {
      fadeAmount = -fadeAmount;
    }
    delay(1000);
  }
}
```

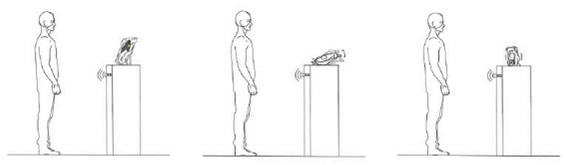


The brightness of straw hat lamp will change like calibration based on the distance of sensor and audience.

PHYSICAL PRODUCTION



INTERACTIVE MODE



When audience pass by, the corn, pomegranate, apple will have faint lights and their brightnesses will change like calibration, while the avocado will have subtle sway; cheese, plate with bones, cactus fruit will not light nor move.

POSTER & FINAL EXHIBITION

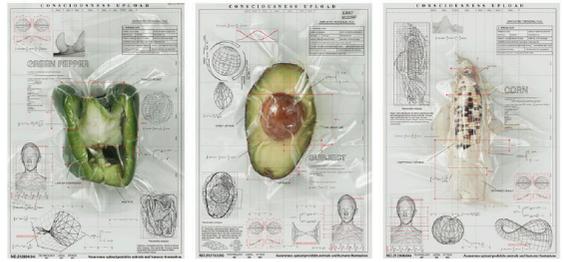


FIGURE 10. Process of the Second Workshop

Within the context of the second workshop, with students gathered from a range of backgrounds, we explored ways to digitize consciousness post-mortem through acts of translation. Daily objects were placed in sealed vacuum bags with LED lights and circuits that animated the objects through light and movement.

What most impressed me about these workshops is the possibility that science and engineering can be integrated with art and design practices. Through coding and other techniques in various media, engineering processes could expand user involvement.



FIGURE 11. Exhibition of the Second Workshop

FUNDAMENTAL
EXPERIENCES SHAPING
MY RESEARCH

1.2

“Why did you transfer your major from engineering to art education?”

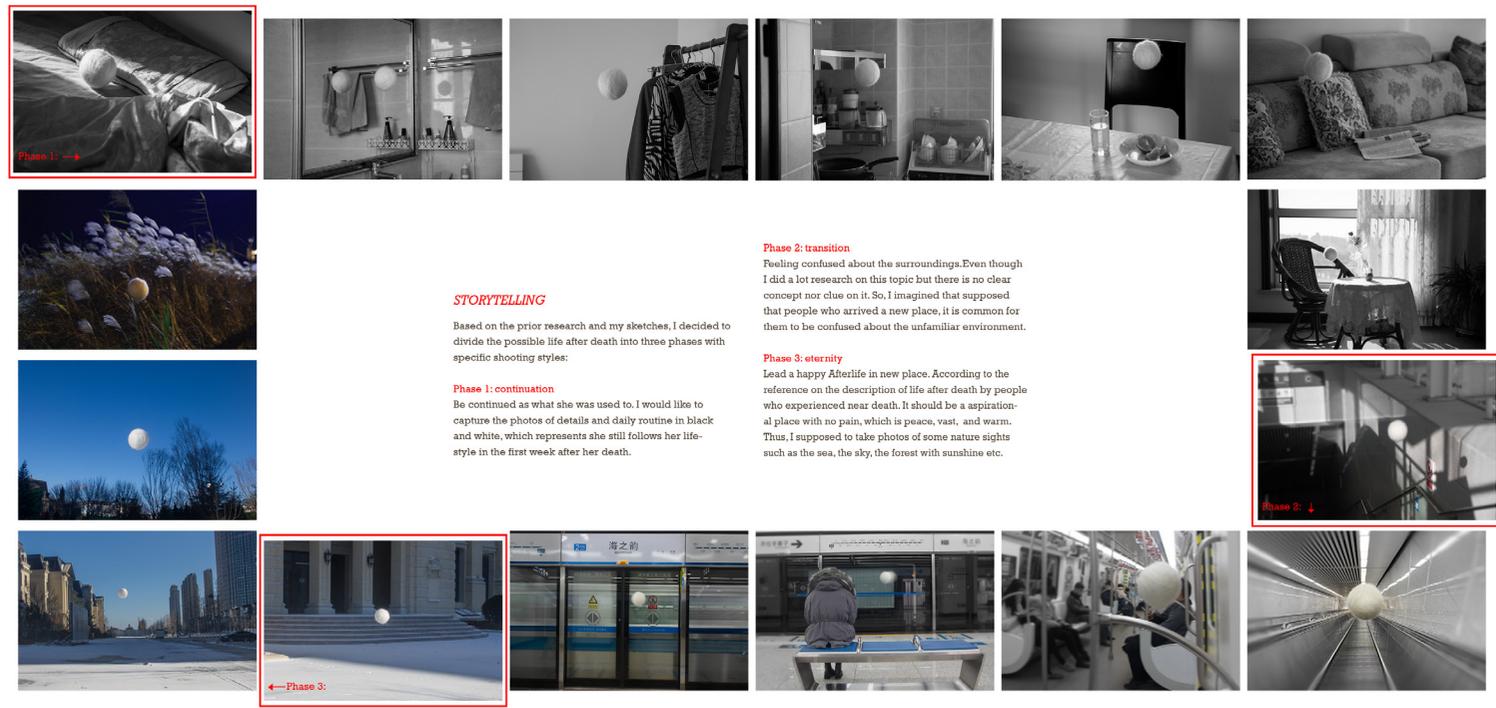


FIGURE 12. Artwork to Express What Life Would Be Like After Death

I am frequently asked about my choice to transfer my major from engineering to art, and especially to art education.

In reaction to the increasingly weakened position of the arts in schools in China and my own background as an engineering student with minimal experience in art, I was inspired by the opportunity to **merge my skills in technology with hands-on activities and concept-based exploration**. Additionally, **art helped me manage a tough time** in my life, with opportunities to reconcile with my interior life. The entire process was deeply healing and helped me align with myself.

I lost my mother who suffered from leukemia for 14 years in December 2018. After which I took a gap year and a semester to allow myself time and space to calm down and to adjust to a new reality. Concerned for my father and relatives, I chose to handle my suffering on my own. Finally, I started to do research about death and life, and interviewed people who experienced a similar trauma, I realized that I can not always be depressed and buried in what seemed like a bottomless valley. Using art as a therapeutic medium, I learned so much about the process of making and deepened my understanding of the life-

death cycle. With this profound awareness, I then wanted to extend these possibilities to others who might also be suffering. Invisible emotions need to find expression and art gave me the language to enable this. and I hope it can help those people as well. This made me think about **how art can be entrusted with educational meaning?**

Research Question

Inspired by my own experience, I would like to focus on interdisciplinary art learning in K-12 education. I found there exists a lot of research on how to bring art into other subjects, such as putting “A” into “STEAM” education, through which art is brought into “STEAM” subjects and achieves an integrated learning approach of science, technology, engineering, art and mathematics. However, there is a lack of research about how other disciplines can be integrated into art classes. This resulted in the main research question of *why interdisciplinary art is important for children and youth, especially in the context of Chinese art education?*

Sub Questions

- What do the traditional art classes look like in China? (When thinking about traditional art classrooms, I would like to address: class atmosphere, lesson content, materials, teaching approach, and students’ actions/experience.)
- What does interdisciplinary art look like?
- In what ways is interdisciplinary art valued (or not) in current Chinese art teaching?
- What is the value of interdisciplinary art for children and youth, especially for children and youth in China?
- How to bring attributes from other disciplines especially core subjects to art class in China?
- What are the potential limitations for popularizing this pedagogy in China?

Brief Introduction of Research Project

The qualitative questionnaires conducted with Chinese educators in Dalian were focused on what traditional art class looks like, curriculum design, the intersection between art and other disciplines, and understanding of interdisciplinary art teaching from the point of view of both art teachers and teachers from other subjects.

Scope and Limitations

The Scope of The Research Project

I only conducted the questionnaires with the educators in my local city, which is limited and is unlikely to represent the general situation of Chinese art education and interdisciplinary art pedagogy in China.

Although the quantity of data from questionnaires was more than I expected, the quality of open-ended questions was less satisfactory because many of them were not familiar with the questions or had less experience related to my focus.

The Pandemic Issue

I would proposed the curriculum I designed for STEAM workshop to be applied into the k-5 schools in China where I have built connection, however, pandemic was serious in Dalian at that time, all the public schools have been shut down, which would be challenging for children to prepare the materials or teachers to observe students’ art making in detail through online classes.

Other Limitations

Many researches on integrated art education, which means bringing Art into STEAM that inspire students’ creativity skills and improve their problem solving capacities (Zalaznick, 2015). It was a big challenge for me to find enough resources that talk about blending other subjects into Art and interdisciplinary teaching in the context of China since it is completely different from that in the US.

CHAPTER 2

ART INTEGRATION & INTERDISCIPLINARY ART EDUCATION

“Interdisciplinary education is an educational approach in which two or more disciplines collaborate in the learning process with the goal of fostering interprofessional interactions that enhance the practice of each discipline.”

American Associate of College in Nursing, Vink et al, 2017

AN EXPLORATION OF THE DIFFERENCES AND CONNECTIONS

2.1

Art Integration VS Interdisciplinary Art

The art discipline serves the “unique educational function” (Gao, 2019, p.78), which encourages students to create problem situations and solve them through developing art learning activities, such as “identifying topics, observing feelings, collecting materials, learning from ideas, conceiving ideas, selecting materials and techniques, exploring performance methods, creating works, presenting communication, and describing, analyzing, interpreting, and evaluating art and interdisciplinary manner” (p.78). Serving as the basis of students’ development, art plays a vital role in learning both psychologically and physically (Stevens, 2002). It encourages students with different backgrounds, prior knowledge, and experiences to engage in communicating diverse cognitions and reflecting on various learning methods, contributing to an in-depth understanding (Selwyn, 1993). Gao’s (2019) also describes the role of art discipline:

The key competence of the art discipline emphasizes the characteristics of the art discipline and the unique educational function. Create problem situations and guide students to develop art learning activities such as identifying topics, observing feelings, collecting materials, learning from ideas, conceiving ideas, selecting materials and techniques, exploring performance methods, creating works, presenting communication, and describing, analyzing, interpreting, and evaluating. ... Encourage students to acquire knowledge and skills in an informational environment, by means of autonomy, cooperation and inquiry, to form ideas and insights, and to learn to solve problems in study, life and work in art and interdisciplinary manner (p.78).

The Kennedy Center, the United States National Cultural Center, defines art integration as “ an approach to teaching in which students construct and demonstrate understanding through art form” (The Kennedy Center, n.d), which means the traditional teacher-centered mode has been replaced by progressive, students-centered teaching mode (The Kennedy Center, n.d). The integration of art into other disciplines promotes diverse learning experiences for students (Rachford, 2011), who are provided with various opportunities to construct and demonstrate their understandings. They are not only just learning and recalling the information, but also are challenged to take the knowledge they learned and make them visible through multiple creative works (The Kennedy Center, n.d). This inspires students to engage in a creative process (Fig. 14) during which interdisciplinary connections are built as well as the evolving objectives are met between art and other specific curriculum (The Kennedy Center, n.d).

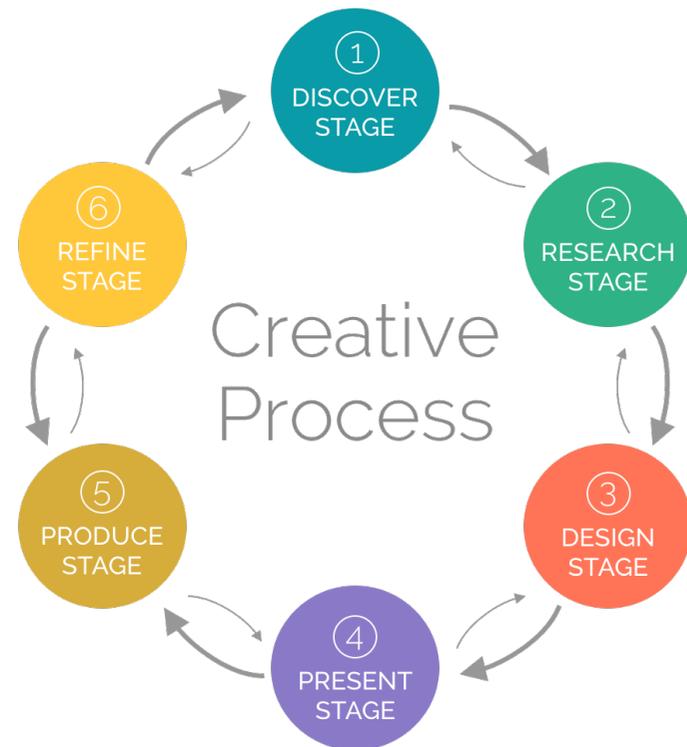


FIGURE 13. Creative Process (Eyecrave Solutions , n,d)

American Association of Colleges in Nursing ((1996) as cited in Vink, et al., 2017) demonstrated the following:

Interdisciplinary education is an educational approach in which two or more disciplines collaborate in the learning process with the goal of fostering interprofessional interactions that enhance the practice of each discipline. Such interdisciplinary education is based on mutual understanding and respect for the actual and potential contributions of the disciplines (p. 32).

Integration and interaction (Vink, et al., 2017) are two important factors of interdisciplinary art education (Welch, & Fasano, 2016), which means insights from art and other disciplinary perspectives should be reconciled and combined (Vink, et al., 2017) in order to deal with complicated, real life problems through a comprehensive understanding and explanation (Vink, et al., 2017).

STEM and STEAM

STEAM, an educational approach that incorporates art into STEM education (science, technology, engineering, and mathematics), has been advocated for by The National Art Education Association (NAEA) in the United States (Chung & Li, 2021). Four criteria guides to STEAM education has been established (Chung & Li, 2021), which are “valuing all STEAM disciplines equally, implementing a wide variety of approaches, encouraging creativity and innovation, and acknowledging the rigor found in visual art” (Hunter-Doniger, 2018, as cited in Chung & Li, 2021, p. 23). To approach STEAM education, the pedagogy of “scientific inquiry, Project-Based Learning (PBL), and Studio Habits of Mind” (Gettings, 2016, as cited in Chung & Li, 2021, p. 3) can be applied in the curriculum. The STEAM education emphasizes students’ “voice and choice” (Chung & Li, 2021, p. 4), which means they are able to take ownership of creative problem solving through art and are encouraged to build interdisciplinary connections among their knowledge and skills (Chung & Li, 2021).

Collaborating with art educators, Mr Tsui, a secondary school art teacher in HongKong, has implemented an issue-based STEAM curriculum that incorporated the engineering, and mathematics of automation and visual art to inspire students to “express their concerns about social issues” (Chung & Li, 2021, p. 9) through art making. Chung & Li (2021) explain that during this STEAM lesson, students applied not only skills of “measurement, estimation, and proportion” (p. 9) in math but also mechanical elements in engineering, including “cams, followers, levers, linkages, and other mechanisms” (p. 9) into art class to create a moving sculpture (Chung & Li, 2021). The concept of the inter-relationship of all curriculum subjects was also shown in “Whole-School STEM initiative,” which aims to integrate the distinctive elements of science, technology, engineering, and mathematics in all subjects (Goodwin et al., 2013). Goodwin et al (2013) mentions that the first step of designing a STEM initiative is to review all core subjects and find relevant contents of each subject. The interdisciplinary integration can be implemented by finding the similarities between each subject, positioning integrative threads, and building correlations to clarify one concept. Which helps students build con-

nections with their learning experiences (Doster, 2004). It shows that students’ performance and engagement are much better than other academic subjects after taking advantage of STEM attributes and applying them to other formal curriculums.

The successful project-based STEAM curriculum in art classrooms will promote students’ creativity skills and help them have a deeper understanding of the learning process by connecting the “established elements in STEM into art practices, design principle and assessment” (James, 2016, as cited in Hawari & Noor, 2020, p. 103). This assists schools to create a diverse and multi-disciplinary learning environment and “assimilates the authenticity of art curriculum” (Oner et al., 2016, as cited in Hawari & Noor, 2020, p. 103).

However, misunderstanding of the integrated approach to STEM and STEAM can be caused when art is only considered to be a tool to enhance teaching and learning STEM, resulting in the fact that “art is often watered down in classroom practice” (Liao, 2016, p.5).

THE VALUE OF INTERDISCIPLINARY EDUCATION

2.2

Analysis of Case Studies in US Contexts

K-12 Classrooms

Steven (2002) indicates that art teachers are responsible for bringing art into every subject throughout the interdisciplinary curriculum and consider it a daily experience instead of isolating their own subjects or planning for a noncontinuous short period. He discusses the creative applications in the “Kadelpian,” a school that is adopting the pedagogy of School as Studio. He provides the example of a specific classroom within this school that utilized Raphael's painting St. George and the Dragon as a way to engage students in a variety of learning experiences in different disciplinary areas. Students were inspired to narrate a story by observing the artwork in language arts class and interpret the features of dragons and other creatures by exploring it in science class. The math teacher took advantage of the painting and asked students to deduce the year when the painter started painting and the age of the painter, while the

historical background and context of the artist's artwork was explored in history class (Stevens, 2002).

In schools where art is emphasized through an integrated curriculum and used as a catalyst to promote other types of subject inquiry, students are seen as artists and actively participate in the process of “interpreting, presenting, performing, and influencing his or her medium” (Stevens, 2002, p.20). The concept of School as Studio provides the innovative strategy to bring attributes in art and other subjects together, facilitating a “complete and free interaction” (Dewey, 1906, p.273) between each discipline in schools. In addition to combining art into other multiple disciplinary classrooms, an integrated learning experience in one classroom where elements in art and other disciplines are blended can be accomplished as well.

The Interdisciplinary Model Programs in the Arts

for Children and Teachers (IMPACT) was introduced by Beverly Radcliffe (1997) and is a concept that integrated all subjects into one classroom. It achieved “parity between art and other instructional areas” and “infusing art into the total curriculum” (p. 25). Radcliffe demonstrates how an interdisciplinary curriculum grounded in art, social science, and music for fifth grade was planned and implemented successfully with teachers responsible in different areas at Barlow Granger Elementary school in Des Moines, Iowa. The trio of subjects provide students with the opportunities to study African culture, including its elements in art, the natural objects in social science, “the rhythms, instruments and songs in music” (p. 52).

In this interdisciplinary experience, teachers are interested in cooperating with their colleagues on collecting students’ work in different classes, as well as planning and preparing each unit together, and promoting this model of teaching broadly. This kind of teaching supports students as they explore possibilities based on their experience and judgement (Radcliffe, 1997). It stressed the importance of treating “children’s life as an integral and a total one” (Dewey, 1906, p. 274)

by connecting activities in different disciplines and tying individual affections, uniting their “personal and social interests” (Dewey, 1906, p. 275).

Outside of the Classrooms

This kind of integrated experience happens outside the traditional classroom as well. Florendo (1998) describes that children’s sense of design can be developed through collaborations with museum and classroom teachers. Florendo (1998) introduced the National Museum of Catholic Art and History’s “Arts on the Go” programs in which artists and museum educators participate in schools and work together with teachers to plan a “integration of classroom subjects with art” (p. 15). They design educational programs and “artist-led workshops” (p. 15) that match subjects and skills into the classes that fit for the lesson concept and children’s age, involving elements such as guest presentations, and performing “hands-on experiments” (p. 15).

Art plays a vital role in achieving a full perspective of integrated teaching with other “content-area subjects such as science, social studies, and language arts” (Florendo, 1998, p. 15). Students are engaged in learning history and become familiar with different places around the world, such as artists’ places of birth (Florendo, 1998). Additionally, students can analyze the historical and biographical elements in each artist’s life by collecting and comparing information based on their perspective and using critical thinking strategies (Florendo, 1998). In addition to that, organizing a trip to museums arouses students’ imaginations and interest in language arts because they can engage in writing activities that are not simply based on words alone, but stemming from paintings and descriptions of artwork (Florendo, 1998). The “Arts on the Go” program aims to encourage students to practice with real subjects, including “thinking-looking and making” (p. 14), and they stress the importance of “self-realization” (Dewey, 1906, p. 276) by offering students opportunities to explore materials on their own and create possibilities in the process of integrated art learning instead of being taught only about textbooks (Florendo, 1998).

Doster (2004) puts forward the idea of Co-Study

curriculum to achieve the goal of expressing American history through integrated art teaching with quantitative components. He mentions applying creative problem-solving skills and integrating art into other subject matters through collaborating with different subjects’ teachers and designing the curriculum based on one theme.

According to articles about integrating art into multiple disciplinary classrooms (Steven, 2002), managing interdisciplinary learning environment in one classroom (Radcliffe, 1997), inviting artists and museum educators in schools to plan an integrated teaching curriculum (Florendo, 1998), and collaborating with different subjects’ teachers (Doster, 2004), it shows that the concept of bringing art into other subjects has been performed in many schools globally. However, there exists a gap, how can we blend the attributes in other disciplines with art, contributing to an integrated art learning space in schools, which will be analyzed in my research.

CHAPTER 3

PERCEPTIONS & PRACTICE OF CHINESE EDUCATORS

“Interdisciplinary education is based on mutual understanding and respect for the actual and potential contributions of the disciplines.”

American Associate of College in Nursing, Vink et al, 2017

AN OVERVIEW OF THE STUDY

3.1

Research Design

This research project was completed by conducting qualitative questionnaires which allowed me to learn what Chinese teachers perceived and how they interpreted their perceptions (Weiss, 1995) about interdisciplinary teaching in China. According to Valenzuela and Shrivastava (2002), questionnaires such as these allow researchers to "understand the meaning" of what our participants have to say, as well as "seek to describe central themes" in their work and experiences (p. 2). I designed two versions of this questionnaire - one for art teachers and one for teachers who are teaching other subjects respectively at kindergarten, elementary, middle and high school in Dalian, China. The content of the questionnaire questions focused on what traditional art class looks like, curriculum design, the intersection between art and other disciplines, and understanding of interdisciplinary art teaching from the point of view of both art teachers and teachers from other subjects.

Participants

A total 104 K-12 teachers teaching at different public schools in Dalian responded my questionnaires, including 32 art teachers (17 from secondary, 10 from elementary, 3 from post secondary, and 2 from kindergarten) and 72 teachers from other subjects (26 from post secondary, 24 from secondary, 20 from elementary, and 2 from kindergarten), where more than 60% come from "core-discipline" (Chinese, Math, English) teachers.



FIGURE 14. Zhaohui, Wang (2021), Art Class, Hong Mei Elementary School, China

Hi there! I am a graduate student at RISD, majoring in art education. I am now working on my master thesis and the topic is **why interdisciplinary art is important for children and youth, especially in the context of Chinese art education?** For my research project, I decided to conduct a survey with Chinese educators to help me have a deep understanding of my research question. I appreciate your time to complete this survey. 您好呀！我是RISD的在读研究生，专业是艺术教育。我现在正在写我的硕士论文，主题是跨学科艺术对儿童和青少年的重要性。我将主要针对其在中国艺术教育的背景下进行调研，因此我围绕这一话题设计了一个调查问卷，希望从和您一样的中国教育家的回答中获得一些资源以帮助我深入了解我的研究问题。

Because of the pandemic and the jet lag, I will use this Q & A format instead of the formal interview. Thanks for your collaboration :) 由于疫情因素和时差关系，我将使用这种问答形式而不是正式采访。感谢您的合作！

Do you mind if your answers will be collected as my data for my thesis research project and be published on the website? 您介意您的回答被我作为我论文研究项目的数据并被发表吗？

Description (optional)

A yes 介意

B no 不介意

LEFT TOP

FIGURE 15. Layout for Introduction of the Quetsionnaire

LEFT BOTTOM

FIGURE 16. Agreement of the Quetsionnaire

RIGHT

FIGURE 17. Questionnaire Designed for Teacher From Other Subjects (left) and Art Teachers (right)

1. Which grade level do you teach now?

您现在教授的年级？

2. Which subject do you teach now?

您现在教授的科目？

3. How many art classes per week in your school?

你们学校一周几节美术课？

4. When designing class contents and lesson plans, will you take the interdisciplinary teaching pedagogy into consideration?

当您设计课程内容和课程大纲时，您会考虑结合其他学科的内容吗？（跨学科的教学方法）

5. Will you communicate with the art teacher in daily teaching? If yes, what will you talk about?

您会和艺术老师在平日教学中交流吗？如果交流，一般是交流的内容是什么？

6. Will you collaborate with the art teacher to design the lesson contents or lesson plan? If yes, what elements will be taken into consideration?

您会和艺术老师配合完成课程设计或教学大纲吗？如果会，您都会考虑什么因素？

7. From your perspective, how can you bring the attributes from the subject you teach into art classes to obtain interdisciplinary teaching?

您觉得如何将您教授科目的一些属性代入到艺术课堂中从而达到交叉学科的教学？

8. If you had relevant experience in interdisciplinary teaching, could you please talk about what's the advantages and barriers of integrating the elements from your teaching subject into art classes?

依照您的经验，您觉得将您教授课程的一些属性结合到艺术课堂有什么优点和缺点？

If you don't have relevant experience, please imagine what benefits and barriers will be encountered when integrating the elements from your teaching subject into art classes?

如果您没有相关经验，您觉得将您教授课程的一些属性融入到艺术课堂可能会带来什么优点，会遇到什么阻碍？

9. Do you mind if your name will be included in my research project?

您介意您的名字出现在我最终发表的论文中吗？

10. Do you mind if your answers will be collected as my data for my thesis research project and be published on the website?

您介意您的回答被我作为我论文研究项目的数据并被发表吗？

1. Which grade level do you teach now?

您现在教授的年级？

2. How many art classes per week in your school?

你们学校一周几节美术课？

3. When designing the lesson contents, will you take the interdisciplinary teaching pedagogy into consideration?

当您设计课程内容和课程大纲时，您会考虑结合其他学科的内容吗？（跨学科的教学方法）

4. What's the art classroom look like in your school?

(materials, curriculum design, activities etc) 介绍一下您学校的美术课堂？（比如材料，课程大纲设计，课堂活动等）

5. Will you communicate with other subject teachers in daily teaching? If yes, what will you talk about?

您会和其他学科老师在平日教学中交流吗？如果交流，一般是交流的内容是什么？

6. Will you collaborate with other subject teachers to design the lesson contents or lesson plan? If yes, what elements will be taken into consideration?

您会和其他学科老师配合完成课程设计或教学大纲吗？如果会，您都会考虑什么因素？

7. From your perspective, how to collaborate with other teachers to achieve an interdisciplinary learning environment for students?

您觉得如何与其他学科的老师配合进而为学生营造交叉学科的课堂？

8. If you had relevant experience in interdisciplinary teaching, could you please talk about what's the advantages and barriers of integrating the elements from your teaching subject into art classes?

依照您的经验，您觉得将您教授课程的一些属性结合到艺术课堂有什么优点和缺点？

If you don't have relevant experience, please imagine what benefits and barriers will be encountered when integrating the elements from your teaching subject into art classes?

如果您没有相关经验，您觉得将您教授课程的一些属性融入到艺术课堂可能会带来什么优点，会遇到什么阻碍？

9. Do you mind if your name will be included in my research project?

您介意您的名字出现在我最终发表的论文中吗？

10. Do you mind if your answers will be collected as my data for my thesis research project and be published on the website?

您介意回答作为我论文研究项目的数据并被发表吗？

PRESENTATION OF DATA AND ANALYSIS

3.2

Collective data from open-ended questionnaires helped me have a better understanding of the current situation of interdisciplinary art teaching in China and explore its potential possibilities.

I categorized the results of the questionnaires according to the grade level, including kindergarten (A), elementary (B), secondary (C), and post-secondary (D) schools and also divided them into different subjects.

Three aspects of Chinese interdisciplinary education were focused in data analysis, including traditional art classes, communication between teachers from different subjects, and teachers' perspective on interdisciplinary teaching.

Art Classroom

Course syllabus and lesson contents are mostly designed and set according to the National Curriculum Standards and combined with some timely social themes. Teachers always present the class using slides and demos to provide students with not only theoretical knowledge but also

visual references. The teaching materials are based on the needs of the course, which is theme-based in every class but materials such as watercolor, clay, paints, crayons, gouache, watercolor, and Ink are commonly used. Teachers tend to make the art activities with those materials as diverse as possible, in order to promote students' multifaceted thinking training and practical ability exercise, however too complicated materials are not allowed to be brought into school.

Students are instructed to appreciate famous paintings, copy artworks and create their own masterpieces independently and cooperatively. Taking full use of the computer and projector is important in art classes, especially shown in secondary school and the lesson is mostly delivered by slides showing combining videos and pictures, which inspires students to have a high-quality visual experience. Sometimes, elementary classroom activities which are active, various and meaningful, are designed by teachers who tend to guide students to think deeply and creatively and fully mobilize students' enthusiasm. Students' participation is always very high, and students' works are of high quality.

A1: Generally, it is mainly to first start with the handmade phase and then let children create their own artworks independently.

B1: The materials and curriculum for art classes are according to the National Curriculum Standards to teach the classes.

B2: The materials are generally prepared by students themselves, and students will not be allowed to bring too complicated materials. Course syllabus is designed according to the National Curriculum Standards.

B3: The materials are normally : Crayons, Ultra Light Clay, Gouache, Watercolor, and Ink.

B4: Classes are always thematic-based creation and the common materials are colored paper, ultra-light clay and paints

C1: Appreciate famous paintings and talk about the feeling of the paintings.

C2: Our courses are according to textbooks. Teachers design course segments, activities, and students perform self-expression independently or cooperatively.

C3: Our lesson contents are according to curriculum standards from the Ministry of Education, Renmei version of textbooks, and combine some timely social themes.

C4: The content of the course is mainly set according to the national curriculum standards; teaching materials are based on the needs of the course but will try to diversify as much as possible, in order to promote students' multifaceted thinking training and practical ability exercise. Classroom activities tend to guide students to think deeply and creatively.

C5: The content of the course is mainly set according to the national curriculum standards; normally shown by slides; Student participation is very high, teachers fully mobilize students' enthusiasm, classrooms are active, and students' works are of high quality.

C6: Different kinds of things that are used in class such as watercolor, clay, paints .The activities in class are active, various and meaningful.

D1: Use the teaching materials of the People's Education Edition, focusing on art appreciation courses

Based on the responses, the experiences of students in art classes at different ages is quite different. “The art classroom is generally divided into two parts, specifically, students will first start with hands-on experiments under the instruction and then they are encouraged to create their artworks or crafts independently” (Questionnaire, Response, Kindergarten Art Teacher, 2022). “Use the teaching materials of the People's Education Edition, focusing on art appreciation courses” (Questionnaire, Response, Post-secondary Art Teacher, 2022).

It can be seen in these quotes above as well as in the examples in image below that kindergarten students have more space to make their own artworks than those in senior high schools, where teachers focus more on the theoretical knowledge of art appreciation from art books.

FIGURE 18. Collective Data for *What Does Art Classrooms Look Like* (A,B,C,D represent art teacher from kindergarten, elementary, secondary and post secondary schools respectively)

Interaction with other discipline teachers

Teachers from other disciplines always communicate with art teachers about students’ art learning, including their behaviour at class, their artworks, comprehensive capacity, and potential in art. In addition to their learning situation, teachers care about students’ mental health as well and they always communicate about students' emotions. Besides, since many core discipline teachers see art class as the space and time to make students feel relaxed, teachers tend to explore the benefit from art learning for students with art teachers as well. Besides, some Chinese literature teachers tend to ask art teachers some questions, mainly about the life and biographies of famous artists, so as to promote students' extracurricular reading. Some math teachers said they will mostly talk about building diagrams and drawing graphics to integrate aesthetic factors into math learning. Besides, research questions, art integration , class discipline and the methods to cultivate students’ imagination skills are also considered. History teachers tend to communicate with art teachers about art history and art development, such as the historical

background of the artists. Physics teacher and art teacher talk about the approaches to create a more complete mind map to better connect and deepen the knowledge of this subject and strategies about letting students take advantage of art to get the most out of it and love art. A post-secondary geography teacher noted that “Combination of the architecture design and the local natural culture in geography”. Teachers from other subjects also mentioned some professional knowledge about art and design will be asked and discussed with art teachers to help students learn more about art culture and cultivate their aesthetic level and creativity skills.

“ Teachers always communicate and collaborate with art teachers to design some activities related to festivals and the characteristics of young children’s physical and mental development factors will be considered” (cited from kindergarten teacher). However, less communication is built between core subjects teachers and art teachers in senior high school because of limited time and energy (cited from post secondary teacher), “ everything can be

A1: Yes, talking about the level of children's understanding.

B1: Yes, teaching pedagogy.

B2: Yes, I will discuss about discipline integration with other teachers.

B3: Yes, application of Information Technology in art classroom.

B4: Yes, new teaching methods, curriculum extension, feedback for long-term student work

B5: Yes, students' acceptance of lesson content

C1: Yes, problems of students' learning

C2: Yes, the application of modern technology in the classroom, the use of electronic products to assist classroom teaching, etc.

C3: Yes, because traditional painting, poetry, calligraphy, painting and printing are not separated.

C4: Yes, the intersection of Interdisciplinary Knowledge, students' personality and situation, and teaching pedagogy.

C5: Yes, talking about the background of the era of art works with history teacher; the use of music in the classroom with music teacher; the use of mathematical thinking in design with math teacher, etc.

C6: Yes, pedagogy and students' performance.

C7: Yes, students' situation of learning status and their behavior.

D1: Sometimes, talking about how to let students comprehend the key content of each subject

found on the internet and we are all busy” (cited from a secondary school math teacher). It is common that teachers tend to search online when problems come up and get theoretical knowledge and solutions directly from the previous experience instead of spending time making practice on it.

FIGURE 19. Collection Data for *What Do Art Teachers Communicate with Other Subject Teachers* (A,B,C,D represent art teacher from kindergarten, elementary, secondary and post secondary schools respectively)

A1: In daily teaching, teachers will communicate with art teachers about weekly time schedules for each discipline, daily activities and students' performance.

B1: Yes, talking about students' behavior and potential in art.

B2: Yes, we talk about how to make student feel relax and enjoy learning.

B3: Yes, I often ask art teachers some questions, mainly about the life and biographies of famous artists, so as to promote students' extracurricular reading.

B4: Yes, I will talk about students' artworks with art teachers.

B5: Yes, taking about the benefit from art learning for students.

C1: Yes, Learning situation, teaching method, teaching process, teaching effect.

C2: Yes, I will talk about teaching content, questions from students with art teachers.

C3: Yes, I always ask for professional knowledge on questions asked by students.

D1: Yes, Aesthetic education.

D2: Yes, The influence of art on teaching and life, learning knowledge, discovering beauty, loving life.

D3: How to design a more complete mind map to better connect and deepen the knowledge of this subject.

FIGURE 20. Collective Data for *what do Chinese teachers communicate with art teachers*

C1: Yes, talking about cultivating students' aesthetic level and creativity

C2: Yes, something about students' character, learning characteristics, and teaching methods

C3: Yes, talking about art Appreciation and Questions

C4: Yes, we will talk about the culture.

D1: Yes, something about how can art be integrated into English class

B1: Yes, talking about research, knowledge and integration of each subject

B2: Yes, but only about class discipline

B3: Yes, about how to cultivate students' imagination skills

C1: Yes, ask about professional knowledge related to art and design.

D1: Yes, something about graphic drawings

D2: Yes, about how to play the role of art for students, so that students can get the most out of it and love art

RIGHT TOP

FIGURE 21. Collective Data for *what do English teachers communicate with art teachers*

RIGHT BOTTOM

FIGURE 22. Collective Data for *what do Math teachers communicate with art teachers*

Interdisciplinary art teaching practice

Teachers' awareness of taking interdisciplinary teaching pedagogy into consideration is relatively weak, resulting in lack of relevant experience in interdisciplinary art teaching and having no clue in some specific questions. However, they expect to explore and practice more about it because they believe that students' comprehensive capacity could be improved from it. When designing lesson plans and curriculum, the interdisciplinary teaching pedagogy will be taken into account but their emphasis has been mostly put on the solo discipline that they expert in instead of collaborating with interdisciplinary teachers.

Proposals have been put forward by teachers from different fields based on "How to bring attributes from other disciplines into art classes and achieve an interdisciplinary art teaching and learning experience?" In terms of the core disciplines, "Literature and art have always complemented each other" (cited from post-secondary Chinese teacher). It is suggested that it will be better to guide students to learn Chinese with perceptible arts by communicating with art teachers and integrating the commonalities and connections between each disci-

pline into each class. This cultivates students' capacity for aesthetics, sentiment, poetic and picturesque, raise their comprehensive skills of historical articles by taking advantage of their imagination and blending scenes, and improve their physical and mental pleasure. The illustrations of Chinese textbooks are very helpful for students to understand the texts, so the combination of pictures and Chinese texts will not only show the beauty of words but also improve students' comprehension ability. Traditional culture, humorous in class, some characters in textbooks and humanistic elements in Chinese can be combined with art as well (cited from secondary school Chinese teacher). In addition, representatives of Chinese traditional culture such as calligraphers, painters can be integrated into art classes, assisting both arts and Chinese teaching, the language expression strategy, and the cultural value of works of art.

There are many intersections between mathematics and art, including mathematical Scales, Figures, Geometry, mathematical axisymmetric, translation, rotation that can be brought into art classes to design some artworks (

Math teacher from secondary school). The math teacher from one of the post secondary schools suggested that students should impart the content related to art in a timely manner, and appreciate the ubiquity of art in mathematics. To be specific, the symmetrical nature of mathematical images can be a special attribute that can be brought into art classes, and some specific graphics of mathematical equations and composition proportions have been taken into account when it comes to graphic design and many other sectors.

English teachers stressed that the beauty of language, and the integration of cultural heritage and the foreign culture can be integrated into art classes, through which students can learn language and its culture at the same time.

Teachers from other non-core subjects also proposed many approachable suggestions to cultivate interdisciplinary art teaching. For example, History teachers thought of introducing the era in which the artwork was created and the background of the artist's stories to students. Geography teachers suggested bringing the natural attributes and

human factors of the region and the sustainable development into art classrooms will be attractive. Similarly, "collecting wildflowers and leaves, inserting them into conical flasks, and explaining the reasons why leaves turn yellow and red in autumn" was demonstrated by a post-secondary biology teacher. Chemistry is the subject that students explore matters, which makes teachers recommend that integrating the structure of materials, chemical reactions and possibilities of innovative structure or materials into art. Besides, When learning atomic structure, the knowledge of art majors to build a three-dimensional sense of space for students. Similar to Chemistry, composition, color and kinetic physics can be integrated into art classes to form interdisciplinary learning. "It would be easy to integrate music into art classrooms and they believe children's imagination skills will be developed and improved through interdisciplinary art learning" (cited from math teacher in elementary school).

Art teachers also expected to experiment more on interdisciplinary art class. From their point of view, bringing some Chinese literature related to art history and

A1: When it comes to bringing attributes from math to art classes, the interviewee said some parts of these two subjects are connected and can be integrated naturally in classes.

B1: Find common content across disciplines

B2:Mathematical Scales, Figures and Geometry

B3:Mathematical axisymmetric, translation, rotation can be substituted

B4: Design beautiful patterns based on translation, rotation, and axisymmetric figures in mathematics

C1: Math and Graphics

C2: composition proportions can be taken into account when it comes to drawing

C3:The cultural value of works of art

D1: The Symmetrical Beauty of Mathematical Images

D2:Teach students the content related to art in this subject in a timely manner, and appreciate the ubiquity of art in mathematics

FIGURE 23. Collective Data for Attributes from Math can be integrated into Art class”

B1:The illustrations of Chinese texts are very helpful for students to understand the texts, so I pay more attention to the effect of the combination of pictures and texts on improving students' comprehension ability, so that the beauty of words and pictures can be combined to give students the best edification.

B2:Integrate traditional culture, or some characters in textbooks, and create with art

B3:Traditional culture in Chinese classrooms can be combined with art, and humanistic elements in Chinese can be combined with art

C1: Introduce calligraphers, painters, etc. from the perspective of Chinese to assist both arts and Chinese teaching

C2:The language expression is the same

C3:The cultural value of works of art

D1: Interdisciplinary teaching always has an intersection, to be specific, literature and art have always complemented each other. It will be better to guide students to learn Chinese with perceptible arts.

D2: Communicate with art teachers and integrate the commonalities and connections between each discipline into each class.

D3:Chinese teaching itself is to cultivate aesthetics, cultivate sentiment, poetic and picturesque, blend scenes, and enjoy physical and mental pleasure.

FIGURE 24. Collective Data for Attributes from Chinese can be integrated into Art class

A1: When it comes to bringing attributes from other subjects to art classes, the interviewee said the integration of variations of children’s physical and mental development are connected.

(C&D)1: The integration of **English** into art classes is aesthetic education in teaching, beauty of language, and the foreign culture and art

C2: The integration of **History** into art classes :Introduce the era in which the artwork was created and the background of the artist’s stories to students

D1:The integration of **Music** into art classes is that it could be achieved and the rhythm could be visualized by art.

D2: The integration of **Geography** into art classes : Bringing the natural attributes and human factors of the region and the sustainable development into the classroom, which will be more characteristic.

D3:The integration of **Biology** class into art classes: Collecting wildflowers and leaves, insert them into conical flasks, and explain the reasons why leaves turn yellow and red in autumn

D4: The integration of **Chemistry** into art classes is about matter, the structure of matter is wonderful, and chemical changes are mysterious. The beauty of chemistry and art can be perfectly combined. Besides, when learning the atomic structure, the knowledge of art majors to build a three-dimensional sense of space for students/

D5: The integration of **Physics** into art classes: Composition, Symmetry, and Color of physics

FIGURE 25. Collective data for Attributes from other subjects can be integrated into Art class

artwork helps students have a holistic and broader understanding of the lesson. Besides, art teachers are expected to integrate more technology into art classes to promote the combination of traditional and digital art. It is generally believed that teachers should build more communication and have more seminar meetings in advance with other discipline teachers and participants in other classes of other subjects (cited from art teacher from post-secondary school) to identify disciplinary commonalities and intersections, grasp their respective difficulties and find a solution together (cited from art teacher from post-secondary school).

CONCLUDING THOUGHTS

3.3

The amount of art classes decreased from 3-5/week in kindergarten and elementary schools to only 1/week in secondary and post secondary schools, which corresponds to the issue of lack of art classes. Even though art curriculum is required to be in accordance with the standards, teachers have the responsibility to think about the diversity of contents and materials, to collaborate with teachers from other subjects about analyzing disciplinary integration, student vision, discipline expansion, the degree of discipline integration in order to design the interdisciplinary teaching curriculum (cited from elementary art teacher). When thinking about collaboration with other teachers, art teachers from secondary school expect to focus more on “teaching methods, synchronicity and inclusion of courses, lesson objectives and difficulties, students’ acceptance ability and the content they communicated with other teachers” (Questionnaire, Response, Secondary school Art teacher, 2022). Art teachers at post secondary school will take the intersection and commonality into consideration.

In elementary school, where students have less burden on coursework and teachers are always cooperating with art teachers to design some activities, events and competitions in daily life. The higher level of class grade, more attention on core subjects while the less emphasis on art class, rooting from the education mechanism in general, especially college entrance exams. The similar trend can be seen in terms of the interaction between teachers, who are not enthusiastic about talking with other subjects teachers. However, the communication between teachers is an essential preparation for interdisciplinary teaching, where teachers can effectively collaborate to design the curriculum based on inquiries. It is noticed that art teachers are more able to talk with other teachers about two categories, which are teaching pedagogy and students’ situations. To be specific, application of Information Technology, curriculum extension (cited from elementary teachers), and intersection of interdisciplinary knowledge (cited from secondary art teacher). It is commonly known

that traditional painting, poetry, calligraphy, painting and printing are always intertwined, which encourages art teachers' desire to talk more about the background of the era of art works with History teacher and the content of textbooks to appreciate the works with Chinese teachers. To diversify the lesson content and help students learn effectively through the interdisciplinary teaching pedagogy, teachers are encouraged to consider the approach to integrate music, mathematical thinking in design, the application of modern technology, the character of plants etc.

On the other hand, students' inquiries and voices are taken into consideration, such as their feedback about the class, acceptance differences of comprehensive understanding, progress and learning methods, behaviors and personalities, questions related to other subjects ect.

The notion of interdisciplinary teaching is a relatively new concept for Chinese educators in my area, which means they are in the process of learning, practicing and exploring. When it comes to collaboration with the art teacher to design the lesson contents or lesson plan, teachers mainly consider scalability and activity and diversity of thinking to complete the design and outline

(cited from secondary teachers). Many other factors are likely to be taken into account, such as students' interests and experience, approaches to improve students' ability to discover the beauty and build relationship with their lives, time and place, aesthetic and traditional culture. In addition, teachers will also discuss the intersection between each subject and consider whether the teaching content of their disciplines is rational for subject integration and whether it is close to children's life that inspires children's interest in art (cited from elementary teachers). For example, integrating elements from math class and creating graphics and animations to increase students' interests. It is important for teachers from different subjects to gather together for lesson preparation and pre-class rehearsal, including doing research about the same topic from different perspectives of different subjects, dividing into units, study teaching methods, extend coursework and comprehensively integrate content and apply one aspect of knowledge.

Even though most teachers lack experience collaborating with art teachers to design curriculum together and improve interdisciplinary teaching, they talked about the advantages and potential barriers of art

integration and interdisciplinary teaching.

It can make students more specific and vivid in the learning process, and it is more convenient for students to grasp the knowledge, through the process not only the flexibility of children's thinking will be improved but also the integration between subjects will be strengthened. Compared to the texts only, the addition of artistic embellishments can simulate students' interest in learning and allows students to deeply understand the text from multiple levels and angles. This will encourage students to find art around their daily life and build relationships with the natural world (cited from kindergarten teachers) and improve their sense of cultural identity, which will promote the achievement of teaching goals (cited from secondary teachers).

If the teaching content is multi-disciplinary, the classrooms will be more innovative and students will be encouraged to come up with novel ideas, which will cultivate them to comprehensively understand knowledge in different aspects. For example, Chinese is the subject that serves as the key to other subjects because doubts can be solved through the language and words, while Art can help students understand knowledge intuitively.

This innovative teaching method will broaden students' knowledge, expand students' cognition and cultivate students' more diverse interests (cited from elementary school teachers). Collaboration with Chinese literature can help students understand what is poetic and pictorial and make knowledge of famous paintings in art class more extensive (cited from secondary school teachers). Interdisciplinary learning brings more possibilities for students, who can think multi-dimensionally by combining cultural identity and fundamental knowledge on multi-disciplines (cited from elementary school history teacher). Integrating multicultural content into art classes makes students realize the importance of cultural diversity and cultural shock, stimulating them to explore unfamiliar concepts in depth. On the other hand, students are encouraged to visualize some complex questions and this makes it easier for them to solve the difficulties from other subjects and are able to build the connections between each subject at the same time (cited from post-secondary teachers).

However, challenges and potential barriers should be taken into consideration as well. Most teachers are concerned about the limited time and resources,

especially in post-secondary school, where the most important objective is related to the college-entrance exam. This makes teachers allocate most of the time designing lessons to adapt the exam in a highly-aimed and fixed mode instead of the creativity and diversity teaching. When thinking about blending other disciplines into classes, students are required to have a higher level of comprehensiveness and the teachers will be equipped with broader knowledge as well (cited from secondary teachers).

Due to the fact that teachers have less experience in interdisciplinary teaching and lack professional knowledge of art, it may take time to do some research about the innovative mechanism and operation related to it (cited from post secondary teachers). It will be very difficult for teachers to prepare material for lessons that integrate multi-subjects because of the less resources and experience and students' thinking diversity and creativity are potential to be restricted when they pursue an integration with less foundation knowledge. When blending other disciplines, even though the class will be enriched by the diversity, the interpretation of knowledge may be biased and the time for practice will be decreased

because more content will be involved in class (cited from elementary teachers). The natural connection between various disciplines instead of just purposely doing that, time management, and cognitive biases requires time and is supposed to practice step by step. Students are required to take time to learn diverse knowledge, which will add to their burden, affect their focus and their academic performances. It would be difficult to find the intersection of art and other disciplines, the recruitment of the professional teachers to guide the interdisciplinary curriculum design should be considered (cited from secondary teachers).

CHAPTER 4

A PERSONAL PHILOSOPHY & EVOLVING PRACTICE

“I hope I can provide my students with a safe space for sharing their experience and exploring possibility.”

Shixin Zhao

MY OWN APPROACH TO INTERDISCIPLINARY ART TEACHING

4.1

Introduction

In an effort to combine my personal history with an evolving curriculum that integrates science and art, I implemented two workshops in Rhode Island. One was offered at Rhode Island Museum of Science and Art (RIMOSA) and the other at the Jewish Alliance of Greater Rhode Island (the Alliance). Within these contexts, I closely observed children's art making, recorded their unfinished or finished artwork, and interviewed the children. Participants in RIMOSA are elementary school students, ranging from grades 4 to 6, while kids at the Alliance are much younger, ranging from kindergarten to grade 2.

Rhode Island Museum of Science and Art is a children's museum with a specific mission to explore various integrated art learning possibilities that bring together art and science in a supportive and fun environment. Specifically, they help children and other multi-generational

learners develop curiosity, motivation, and problem-solving skills by offering portable programs, distance-learning (materials and videos are supplied) and workshops. Their vision is to create open-ended experiments and creative problem-solving experiences.

The program J- Space at The Jewish Alliance of Greater Rhode Island is a weekday after school enrichment program that includes activities such as STEM, the arts, athletics/movement, teambuilding, and Judaism. Their vision is to grow outstanding citizens and problem solvers working together for a better world. In the following sections I will describe a lesson I designed and taught at both RIMOSA and the Alliance that aimed to integrate art with other subject areas, like science.

Color And Chemistry



Color and Chemistry

Instructor: Shixin Zhao
Time needed: 60 Minutes

Objective: I can help students to find out/discover the relationship between science and art in their daily life. I hope students can think about different colors in nature by observing their surroundings.

Preparation:

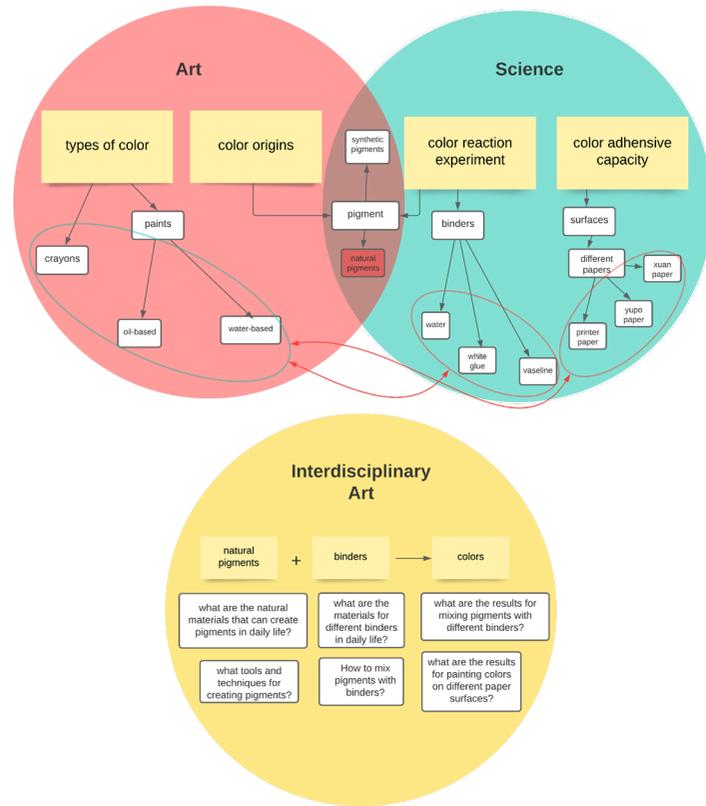
- Collect available stuff with different colors and try to make pigments on my own, aiming to come up with questions and find out the main focus for this workshop
- Experiment the pigments with different binders (water, vaseline, egg yolk, vinegar) on my own, aiming to explore the possibilities and figure out the approximate time for each activity.

Materials:

- Pigments: red pepper, turmeric powder, blueberries (fresh or frozen), raspberries (fresh or frozen), pink salt, coffee, matches or burnt bits of wood, mint leaves, sugars with colors, chalks
- Binders: water, vaseline, Elmer's white glue
- Tools: paper plates, 6 rocks for grinding, 6 white plastic lids for mixing paints, many craft sticks, 6 bottle caps for water, 6 paintbrushes
- Papers: printer papers, yupo papers, Xuan papers

Procedures:

- Introductions/Welcome (5 minutes)
- Warm up (5min)
Questions: *What colors can you see in daily life? Pigment is truly the color from nature. Do you know why the things you mentioned like animals, plants, and flowers are in different colors?*
- Experiment with nature pigments (15min)
- Provide students with papers and materials, paint brushes, containers with water, small containers to make paint
- Encourage students to try different techniques such as grinding, or smashing and the material onto the paper and add a little water to make a paint and use a brush to paint on paper.
- Activity of adding different binders (10min)
- Show them with different binders and encourage them to try with different materials holding the pigment (artists call them "binders") or mixed binders.
- Inspired students to think about and discuss the difference between water, glue and vaseline?
- Discussion and survey (10 minutes)
-What was your favorite technique/material? Why? Did you come up with any new techniques? What techniques worked best? What do you like that someone else did?



Curriculum Concept and Design

“Simply adding paint, tape and glue doesn’t make it a STEAM lesson. That diminishes the deep process-based learning that is inherent to the arts. Instead, the lesson should be actively teaching arts through the application of skills students have learned during dedicated arts times” (Institute for Arts Integration and STEAM, 2020, p.2). The goal of my curriculum is to encourage students to think about the colors in nature and to build a relationship between science and art by exploring color pigments and openly experimenting with them on different paper surfaces.

To activate the learning process, I focussed on “color pigments and then started thinking about their key attributes across science and art, including types of mediums (water color paints, oil paints, and crayons, etc.) and the sources (mineral or synthetic), as well as reactive and adhesive capabilities.

OPPOSITE LEFT
FIGURE 26. Mind Map for curriculum design

OPPOSITE RIGHT
FIGURE 27. Curriculum Design



FIGURE 28. Tools For the Workshop at RIMOSA



FIGURE 29. Preparation for the Class at the Alliance

Teaching Process In Two Settings

In each class, I encouraged students to experiment with the natural pigments through different techniques, including grinding with rocks, smashing with wooden sticks and then adding water to make water-color paints. In addition, they explored different binders such as white glue, vaseline to make oil-based paints and crayons-like colors. I, as an investigator, “collected in-depth data involving multiple sources of information” (Koh, 2020, p.108) by observing the process of children’s art making and interviewing with learners about their reflections about the art class.

Experiment with natural pigments

Students used rocks to grind the pink salt, various peppers, turmeric powders, and coffee to make fine powders in light pink, orange, yellow and brown. They also crushed the fresh berries and leaves to create the authentic blue, purple, pink, red and green.

Activity of adding different binders

Students were encouraged to add water, white glue and vaseline to the pigments to create watercolor paints and crayons.

Experiment with different papers

Students painted on the printer papers, yupo papers, and cardboards to explore the differences between the adhesive capabilities of different colors on different surfaces.

The Workshop at RIMOSA



FIGURE 30. Process of Experiment with Different Pigments



FIGURE 31. Process of Experiment with Different Tools

Reflection

These workshops began with a simple goal: to offer children and youth more space to explore art and science through hands-on experiment and encourage them to observe their living surroundings where there are many opportunities to find art. Emphasis was placed on experience rather than on the final product. Through opening their curiosity, and capacities they were given many opportunities to integrate their learning into art activities. My role, on the other hand, was to guide and inspire students with different backgrounds to reflect on what they learned from other disciplines and what they have discovered from the natural world.



FIGURE 32. Colors that are created with different natural pigments

The Class at the Alliance



FIGURE 33. Process of Experiment with chalks



FIGURE 34. Process of Experiment with fruits

Compared with the older age groups in the RIMOSA workshop, the younger kids are more active and they always desire to explore their curiosities by asking questions and experimenting without worrying about making mistakes or messing up things. When I interacted with them, I was inspired by their innovative thoughts and expressions, in which cultural experience can be understood (Yoon, 2019). Not only the participants were observed but also, I had the opportunity not only to get the “firsthand encounters and observations” (Powell, 2010, p. 45) about children’s art making but also to “conduct open-ended interviews or informal conversations” (Bhattacharya, 2017, p.112) with children at RIMOSA and the Alliance. I collected and analyzed the records and artifacts (Powell, 2010) that urge me to think more deeply about implementable elements for interdisciplinary teaching and help me reflect on my teaching pedagogy.

FIGURE 36. Process of Experiment with spices



FIGURE 37. Process of Experiment with water-bases paints



INTERDISCIPLINARY ARTISTIC PRACTICE

4.2

Mapping Project

Over the past eight months, much of my own work has been inspired by this thesis inquiry related to interdisciplinary art education. In one particular project from Dr. Blake Smith's Mapping Visual Arts Learning course at RISD I was tasked to create an artistic mapping work that foregrounds the theme of the thesis and connects the local sites visually and aesthetically. I decided to create something that was inspired by the physical space of RIMOSA.

Inspired by Noorata's drunkard's spiraling thoughts (Fig.38, Fig.39) that depicted a spiraling whirlwind of thoughts physically emerging from a drunk's head by using wax and mixed media, I began to redesign children's artworks and display them through an "interdisciplinary" way in a space in my own artistic practice. The sculpture art was not only enclosed "interdisciplinary" artworks by children but also resonated with my visualized cross-disciplinary focus as well by bringing in children's artworks and building connections with the physical layout of the museum.



FIGURE 38, 39. A DRUNKARD'S SPIRALING THOUGHTS, PINAR NOORATA, MAY 22, 2012



FIGURE 40. Final Installation

Design Process

I selected the dining room in my apartment as the space to display the final art which was firstly divided into four main parts according to the layout of the museum with crossed wires which also symbolizes the intersection between art and science.

Specifically, the collective intricate geometric images were hung on the right side of my final artwork (Fig.40) in a specific locus which is similar to the structure of a harmonograph (Fig.41), consisting of a table that supports three built-in pendulums. Children can manipulate the pendulums and watch the arms create an intricate geometric image (Fig.42), which is an example of the integration of math and art.

The left side of my artwork exhibits the spin artworks (Fig.43) which were rolled and displayed in a special spiral shape that reflects my experience in trying spin art at RIMOSA both mentally and physically.

The zoetrope artworks that were shown like a film curtain (Fig.44) indicates the process of artmaking is like the process of storytelling, during which children can build connections between life and art.

Finally, I exhibited the artworks from a previous workshop about chemistry and art by going through the wooden stick and randomly placing some of them around it. What I would like to express is that the interdisciplinary workshop is the fruition through which children not only explored chemistry but also created their amazing artworks (Fig.45). Besides, some chemistry-based flower shape artworks were tied together in the intersection of the spaces.



FIGURE 41. Harmonograph, RIMOSA



FIGURE 42. Intricate Geometric Images, RIMOSA

Reflection

“Visual art learning is reliant on a complex system of perceptual, higher cognitive, and motor functions, thus suggesting a shared neural substrate and strong potential for cross-cognitive transfer in learning and creativity” (Tyler & Likova, 2012, p.1). This art-based research inspired me to visualize my ideas and concepts aesthetically and logically in a new approach, which enables me to have a deeper understanding of interdisciplinary art education.

Through collecting and redesigning these children’s artworks, I not only perceived a rush of imagination in the kids but also realized many possibilities that can be achieved through integrating art and science in art learning. I was especially inspired by discovering the attributes of other disciplines and building connections with art, which allows me to start thinking about what can be connected with art and take aspects from different subjects into consideration when designing the curriculum in my teaching.

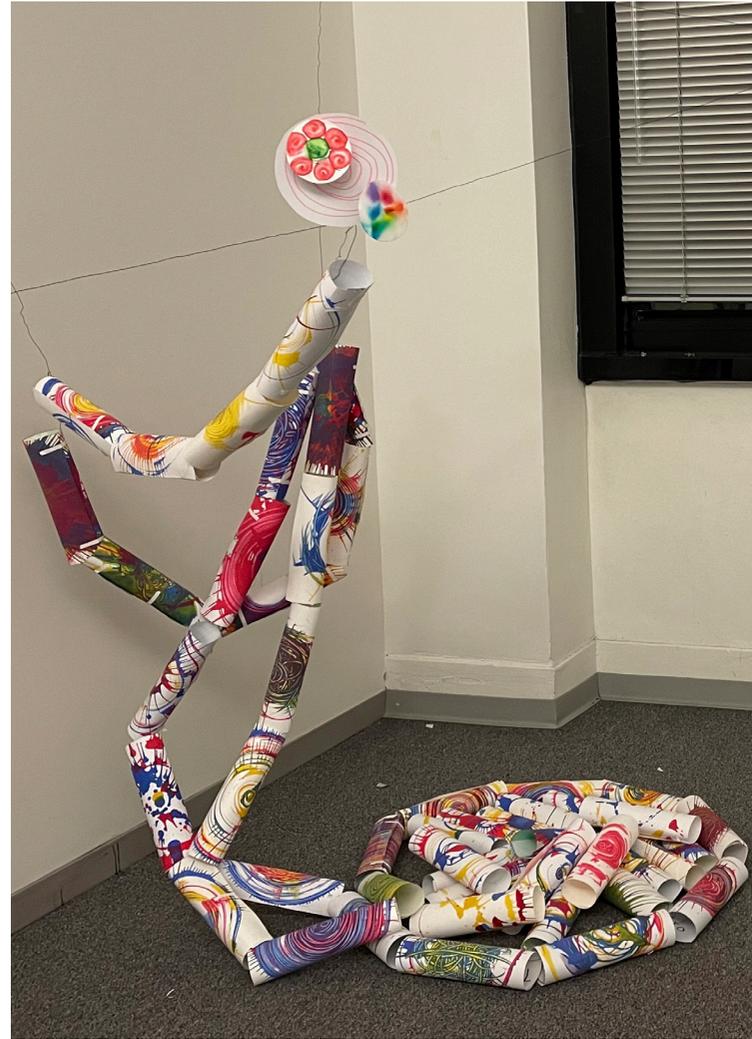


FIGURE 43.44.45. Left Part of the Installation, *RIMOSA*



FIGURE 46. Artworks From Zoetrope Station, *RIMOSA*



FIGURE 47.48. Artworks From Chemistry Workshop, *RIMOSA*



CHAPTER 5

REFLECTIONS & LOOKING FORWARD

“The outcome of this study is a working philosophy born from multiple experiments in the United States. From this experience, I wish to introduce this teaching philosophy into the school system in China.”

Shixin Zhao

CONCLUSION FROM THE RESEARCH PROJECT

5.1

At the beginning of this thesis, I posed the question: Why is interdisciplinary art important for children and youth, especially in the context of Chinese art education? Interdisciplinary teaching can help students grasp the knowledge in a more specific and vivid way in the learning process, through which not only the flexibility of their thinking will be improved but also the integration between subjects will be strengthened. Compared to the texts as the only forms of the lesson content, the addition of artistic elements into curriculums can simulate students' interest in learning and deepen their understanding of the topic from multiple levels and angles. This can encourage students to find art around their daily life and build relationships with the natural world (Questionnaire, Response, Kindergarten Teachers, 2022), as well as improve their sense of cultural identity. Additionally, this also promotes the achievement of teaching goals (Questionnaire, Response, Secondary Teachers, 2022). If the teaching content is multi-disciplinary, the classrooms will be more innovative and students will be encouraged to come up

with novel ideas, which will allow them to comprehensively understand knowledge in different aspects. For example, Chinese is the subject that serves as the key to other subjects because ideas can be explored through the language and words, while Art can help students understand knowledge intuitively. Collaborations between Art and Chinese literature can help students understand what is poetic and pictorial, empowering more extensive knowledge of famous paintings in art class (Questionnaire, Response, Secondary School Teachers, 2022). This innovative teaching method will broaden students' knowledge, expand students' cognition and cultivate students' more diverse interests (Questionnaire, Response, Elementary Teachers, 2022). Interdisciplinary learning brings more possibilities for students, who can think multi-dimensionally by combining cultural identity and fundamental knowledge on multi-disciplines (Questionnaire, Response, Elementary History Teachers, 2022). Integrating multicultural content into art classes helps students realize the importance of cultural diversity and cultural shock, pushing them to

explore unfamiliar concepts in depth. On the other hand, students are encouraged to visualize complex questions. This makes it easier for them to solve problems from other subjects and they are able to build connections between each subject at the same time (Questionnaire, Response, Post-Secondary Teachers, 2022).

However, challenges and potential barriers should be taken into consideration as well. Most art teachers in China tend to follow the national standards when designing curriculums (in terms of the contents, materials and activities) instead of creating innovative cross-disciplinary curriculum by collaborating with teachers from other subjects. Rather than simply taking traditional arts standards into account, art teachers should be encouraged to think more broadly. While considering the diversity of materials and activities connected to art, they should also be thinking about collaborating with teachers from other subject areas to analyze disciplinary integration, students' vision, discipline expansion, and the approach of discipline integration in order to design an interdisciplinary teaching curriculum (Questionnaire, Response, Elementary school Art teacher, 2022).

The communication between teachers is an essential

component for interdisciplinary teaching, where teachers can effectively collaborate to design the curriculum based on their collective ideas. It is commonly known that traditional painting, poetry, calligraphy, painting and printing are always intertwined, which encourages art teachers' desire to talk more about the background of the era of art works with History teacher and the content of textbooks to appreciate the works with Chinese teachers. To diversify the lesson content and help students learn effectively through the interdisciplinary teaching pedagogy, teachers should be encouraged to also consider ways to integrate music, mathematical thinking in design, the application of modern technology, the character of plants, etc. into their curriculum too (Questionnaire, Response, Post-Secondary Teachers, 2022). Students' inquiries and voices should also be taken into consideration, such as their feedback about the class, acceptance differences of comprehensive understanding, progress and learning methods, behaviors and personalities, questions related to other subjects, etc.

The notion of interdisciplinary teaching is a relatively new concept for Chinese educators in Dalian city, and teachers are in the process of learning, practicing and exploring. When it comes to collaborations with

art teachers to design the lesson contents or lesson plan, teachers mainly will consider scalability and activity and diversity of thinking to complete the design and outline (Questionnaire, Response, Secondary Teachers, 2022). Many other factors are likely to be taken into account, such as students' interests and experience, approaches to improve students' ability to discover the beauty and build relationship with their lives, time and place, aesthetic and traditional culture. In addition, teachers are also supposed to discuss the intersection between each subject and consider whether the teaching content of their disciplines is rationale for subject integration and whether it is close to children's life that inspires children's interest in art (Questionnaire, Response, Elementary Teachers, 2022). For example, integrating elements from math class and creating graphics and animations to increase students' interests. It is important for teachers from different subjects to gather together for lesson preparation and pre-class rehearsal, including doing research about the same topic from different perspectives of different subjects, dividing into units, study teaching methods, extend coursework and comprehensively integrate content and apply one aspect of knowledge. Additionally, the recruitment of professional

teachers to guide the interdisciplinary curriculum design should be considered at schools (Questionnaire, Response, Secondary School Teachers, 2022), especially at the beginning of a new experiment when it might be difficult to find the best approach to realize the intersection of art and other disciplines.

Although the idea of offering Professional Development (PRO-D) for teachers did not come to my questionnaire, I would like to propose it as an opportunity to create a vision of knowledge and skills required to succeed in interdisciplinary art teaching, formal and informal evaluation and professional strategies (The regents of the University of California, 2022) to extend the possibilities of art integration and interdisciplinary art teaching in China.

TEACHING PHILOSOPHY

5.2

The outcome of my own interdisciplinary research as an art educator and artist is a working philosophy born from multiple experiments with a range of students in various spaces and my personal artistic practice in the United States. From this experience, I wish to introduce this teaching philosophy into the school system in China.

To invite students from grades kindergarten to high school with various degrees of art knowledge to come together and openly engage in art classes.

To offer curricula that is cross disciplinary and mixed media.

To encourage resourcefulness by sourcing readily accessible materials from the natural world or daily life.

To provide maker spaces that fosters joy and foregrounds process over product, allowing participants to experiment freely with a range of materials.

To develop collaborative opportunities both within and outside the classroom to break free out of disciplinary constraints.

To use art as an empowering tool for self expression and problem-solving.

To create a respectful and safe space for participants across race and culture.

To foster communities of relationships that encourage a sense of belonging.

IMAGINING THE FUTURE

5.3

A one-year program of graduate study in the US provided me with numerous opportunities to investigate and explore my interests, contributing to the transition of my identity from an engineer to an interdisciplinary artist and art educator. This period of concentrated study, inspired and guided my research and process in both art teaching and artistic practice. With the philosophy reflected from the project that I conducted with Chinese K-12 educators, I look forward to collaborating with the school settings in Dalian and implementing my teaching philosophy.

During the course of this study, my original research questions, along with the sub questions were resolved. However, during the process, several new questions arose. I now invite my peers in China to think alongside me.

What do you consider the key elements necessary for teachers to design an interdisciplinary curriculum that is suitable for the Chinese education system?

Given that this is a new concept, what might be a concrete starting point for Chinese educators

*to embrace this innovative teaching pedagogy?
If interdisciplinary teaching were taken into consideration as a normal way of education, does it mean teachers should master different areas of knowledge?*

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Central to this thesis investigation is the premise that interdisciplinary art is important for children and youth, especially in the context of Chinese art education. Designed to investigate a movement in art education beyond traditional boundaries, this investigation manifests in four stages of research and concludes with a teaching philosophy for the Chinese school system.