This is an excerpt of my capstone, "Visual Thinking Strategies: Connecting underrepresented adolescents to online art museum education"

Introduction

What is the role of art museums? Today's art museums take various shapes and forms, from ethnically focused museums to virtual reality environments. Historically, art museums have held an elitist and authoritative stance (Hooper-Greenhill, 2000) and barred minorities, especially African Americans, from entry to the physical spaces and to the walls of the museums (Moore, 2020). Significant efforts have been made to re-define fine art institutions as educational spaces for active learning (Hooper-Greenhill, 2000; Murray, 2020; Rhee 2013), meaning-making (Kristinsdóttir,2017; Moore, 2020; Williams,1996), difficult conversations (Levitt, 2015), and boundless interpretations (Burnham & Kai-Kee, 2007). Scholars broadly hold the advantages of art-viewing and art museum exposure, and an increasing body of research calls for access and equity for underserved populations to benefit more from art museum education. In response, twenty-first-century art museums have taken initiatives to include voices of the underrepresented population. Such efforts include investing time, money, and space to appeal to adolescents, the most underrepresented age demographic, through the development of many teen art education programs that range from one day activity to school-museum partnerships (Pierroux et al., 2011; Nettleton & Heller, 2006; Striepe, 2013).

Yet, a recent study shows that there is still substantial work to be done to diversify the overwhelmingly white representation in permanent collections (Topaz, 2019), staff (Schonfeld et al., 2019), and visitor demographics (Farrell & Medvedeva, 2010). Furthermore, studies have pointed to the contemporary physical museum spaces as foreign, inaccessible, and didactic for many minority visitors (Garibay, 2011; Winstanley, 2013). In this course paper extension project, I will focus on addressing the need for teenagers who are members of racial and ethnic groups underrepresented in major American art museums to feel more connected and equipped to construct meaningful knowledge in art museum space. By leveraging Visual Thinking Strategies (VTS) in an online art museum education context, this capstone addresses the developmentally appropriate need for this population to freely puzzle, critically think, and feel a sense of belonging through connecting with artwork, artists, and peers. Drawing the parallels between asset-based pedagogies and VTS, this project will dive into how VTS as an asset-based tool has the potential to empower American adolescents to build intellectual, social, and political resources, as their interpretations are put equal to other voices presented in art museums.

Educational Need

Who are adolescents?

Understanding the distinct developmental characteristics of adolescence is essential in creating a successful art museum experience for teens. Adolescence, derived from a Latin word *adolescere* which means to grow up, refers to a developmental period of transitioning between childhood and adulthood. It is also often regarded as a phase of opportunities and risks. There has been a long debate over using chronological age to define the concept of adolescence. Age has been used as a convenient marker for this developmental phase. For example, Granville Stanley Hall (1905), one of the early key contributors to adolescent research, suggested that a significant shift towards adolescence happens around age 12. More recently, in the Global Strategy for Women's, Children's and Adolescent' health (2016-30), World Health Organization defined adolescence as 10 to 19 years of age (Sawyer et al., 2018). Moreover, the concept of adolescence often gets overlapped with the term youth, teens, and young adults, as they represent similar age groups. Meanwhile, several researchers (Petersen, 1988; Neugarten, 1979; Sawyer et al., 2018; Yoshikawa & Seidman, 2000) have posed that chronological age is not an appropriate index as individuals' cultural, ethnic, economic backgrounds and pubertal changes have significant influences. For this capstone, I will be using Sawyer, Azzopardi, Wickremarathne, and Patton (2018)'s broader and more comprehensive definition of *adolescence* as "the notion of the growing individual who is able to take increasing responsibility, but who still needs more protection than an adult" (p.223). Such definition allows teen programming at art museums to open doors to more prospective participants from diverse backgrounds.

Art Museums as educational tools

Museums have not always considered teens as key stakeholders in their programming or exhibition designs, nor did these institutions view themselves as educational spaces for diverse communities until recently. In her comparative study of teen programs hosted by US art institutions, Daniels (2016) comments on the scarcity of literature on teens and art museum education as such concept is relatively new and narrowly focused. (…) Many art museums strive to no longer hold an elitist, authoritative stance but rather serve as spaces for exchanging knowledge, leisure, and enjoyment. Burham and Kai-Kee (2007), leading figures in museum education, share their visions on the art museums' role in the twenty-first century. The authors suggest that art museums should be an inviting place for people to express different meanings and interpretations made through prior experience and knowledge. In other words, no interpretations blooming within these spaces are right or wrong, and the visitors' thoughts are as valuable as the institutions' intended meaning of the works. They allude to John Dewey to point out that art comes to life through the endeavors of visitors, educators, curators, and institutions. The authors emphasize that the rich knowledge of the collections and experience with the community enable museum experiences to foster more active engagement, imagination, and reflection from the visitors.

Moreover, the body of research on arts, museum studies, and informal learning suggests viewing art museums as sites for expanding our understanding of how people learn informally. This was followed by many empirical studies on transferable learning outcomes and different approaches to provoke deep and active learning in these spaces. Research broadly shows the link between art museum education and critical and creative thinking skills (Housen, 2002; Hubard, 2011; Kisida et al., 2014; Moeller et al., 2013). For example, Kisida and his colleagues (2014) conducted a large-scale randomized-control trial to explore the effects of exposure to art museums for K-12 students. This study assessed groups that had been randomly selected to get funding for an art museum field trip and receive a tour. They discovered the positive correlation between students participating in these culturally enriching field trips and their ability to retain historical and sociological information, cultivate cultural taste, and build critical thinking skills and historical empathy. Also, Cloutier et al. (2016) convey that art museums can be critical pedagogical spaces that allow for language learning, cross-cultural mediation, and identity work. Art museum field trips have been viewed as a tool to bridge formal and informal education and to provide a culturally enriching experience and opportunities, especially for less-advantaged students who are unlikely to have access outside of schools, to benefit from positive outcomes of art exposure (Pierroux et al., 2011; Kisida et al., 2016). Moreover, recent museum education scholarship has shown teen-targeted programs can positively influence teens' identity development by cultivating talking skills, meaning-making skills, discursive and observational competence (Daniels, 2016; Pierroux et al., 2011). Phyllis Magrab, professor of Pediatrics at Georgetown University, draws a connection between the unique developmental characteristics of teens and the power of aesthetic experience, "the transaction between artists, the work of art, and the viewer" in supporting this population's needs (Magrab, 2006, p.7). She conveys the unique value of aesthetic experience as learning opportunities for teens to develop pluralistic intelligence - important skills to acquire for adulthood (e.g., emotional, interpersonal, visual-spatial, intrapersonal, linguistic, logical) (…)

Limitation of the physical spaces of art museums

Despite the values of fine arts institutions as educational spaces for adolescents, as Wyrick (2014) points out, there seems to be a discrepancy between museum studies theories and current practices that seem to lack providing relevant, valuable, and equitable learning materials or representations in physical spaces of museums. For the purpose of this discussion, I draw on Desai (2000)'s definition of *representation:* "All forms of *representations*, including the visual, play a vital role in the way we understand ourselves and our world, and consequently, in the way we understand our role in changing the circumstances that shape our world" (p.116).

Often, minority art - underrepresented artworks by often non-Eurocentric artists - exhibitions are displayed to increase representation and appeal to diverse visitors (Marzio, 1991). Conversely, the Guerrilla Girls (1995), a collective of feminist art-world agitators, remind us through their lithograph poster that while museums increasingly incorporate these historically minority art, often these are special exhibits or

confined to tokenism. They (1995) print: "[Minority Artists'] busiest months are February (Black History Month,) March (Women's History,) April (Asian-American Awareness,) June (Stonewall Anniversary), and September (Latino Heritage)." Twenty-six years later, this statement sadly still applies. Such dominant power of Euro-centric representation results in marginalized groups seeing themselves as "the other" and often labels minority art as craft or folk, putting its value lower than "fine art" (Desai, 2000). Accordingly, teenagers are placed in a position to question the value and worthiness of their communities' work and their sense of belonging to the physical space and discipline. Furthermore, the global advocacy imitative and the hashtag #museumsarenotneutral, produced by Art Worker La Tanya S. Autry and Museum Educator Mike Murawski, underscore the neutrality issues within museum institutions. Such a campaign critically points to the Eurocentric and colonialist perspectives, misrepresentation or objectifying marginalized communities' heritage and people. Along with the two producers of this campaign, many museum professionals and scholars have urged efforts toward dismantling oppression and systematic racism in these institutions and acknowledging museums' cultural and political power over visitors.

A recent study around 18 major U.S. art museums, inferring genders, ethnicities, geographic origins, and birth decades of artists, found that 85.4 percent of the permanent collection are works by white men. The lack of representation within these spaces becomes even more apparent when an underrepresented individual walks into a major U.S. art museum, as white presence is dominantly prevalent amongst staff and visitors. A 2018 art museum staff demographic survey conducted by Andrew W. Mellon Foundation shows that people of color represent only 28% of all staff members and 12% in a museum leadership position. Moreover, recent empirical findings demonstrate the lack of representation of people of color in museums as both professionals and visitors. The lack of diversity in these settings visible through the staff members, fellow visitors, and collections can add to a feeling of exclusion for minorities visiting museums. Various museums education studies and surveys reveal how museums as physical spaces are intimidating to minority visitors (Garibay, 2011; Samis & Michaelson, 2017; Winstanely, 2013). In describing the general visitors' experience in a 'white cube' architecture of art museums and galleries, Hornecker and Ciolfi (2019) point out how visitors are expected to uphold general rules of behavior, which results in the art being viewed as sacred and people to behave as they are in church. These social codes of how one should behave in a museum put a hierarchy and create both physical and mental barriers between artworks and the viewers. The physical layout and exhibition design of these spaces also contribute to creating a barrier. Sweller (2020) writes that a significant number of visitors find navigating the museums difficult and spending more energy and time on orienting themselves in the physical museum space than on the actual contemplation of the exhibits. Cecilia Garibay (2011) also points to the space limitations of physical museums concerning a specific historically underrepresented visitor population – Latin American families. Her collected data of participants shows that most view museums and their content to be as passive, inaccessible, unwelcoming, or difficult to understand. While this data does not reflect all the targeted demographics of this capstone, it provides insight on how lack of cultural relevance or representation could negatively impact visitors' active engagement or sense of belonging to art museums.

In addressing this ongoing issue for inclusivity, scholars across museum studies and education disciplines have attempted to develop an access and equity framework for informal educational settings and conduct a few studies around the minority population (Dawson, 2014). Also, museums like the Queens Museum are making an effort to include voices of the underrepresented people in their exhibitions through community outreach projects and the establishment of community advisory committees (Levitt, 2015; Wilson, 2015). In addition, the dilemma and challenges these institutions encounter when attempting to increase diversity and inclusion are worth noting. In his paper “Minorities and Fine Arts Museums in the United States,” Marzio (1991), former art museum director at the Museum of Fine Arts in Houston, shares the successes and obstacles around organizing minority art exhibitions, making steps toward more minority representation in their collections. Some of the challenges include the conversations around displaying minority arts in general American Art galleries or contemporary galleries, the controversies around whether the labels are concise enough to provoke interpretations while adequately representing the community of the work. Although he describes this process as costly, time-consuming, Marzio (1991) argues that art museums should aim to broaden their audience, work collaboratively between institutions to overcome the

lack of exposure and representation and access for the underrepresented minority population. Though many essential steps are taken toward inclusivity and diversity in these spaces, more work is still to be done to provide equal and accessible educational opportunities for underrepresented teens.

Educational Solution

While acknowledging the successes and limitations of both physical and virtual museum learning spaces, this educational solution section investigates the potential of using Visual Thinking Strategies as an asset-based tool for underserved teens to have a culturally validating learning experience that can be translated to their everyday lives. More specifically, related technologies and existing solutions in various disciplines will be examined to illustrate potential of expanding VTS in an online environment, where minority teens can "actively create, own their ideas, share across all conceivable boundaries, and build their own knowledge-base" (Wyrick, 2014, p.232).

Visual Thinking Strategies as an asset-based teaching tool

Over two decades, many scholars have urged to dismantle the dominant narrative and pervasive assumptions that label students from marginalized communities by their supposed deficits. Deficit ideologies, often reflective of Eurocentric views, focus on 'saving' underserved students instead of addressing the real issues that have led to such inequality (Flint & Jaggers, 2021). Asset-based pedagogies, such as Ladson-Billing (1995)'s culturally relevant pedagogy and Moll and his colleagues (1992)'s fund of knowledge approach, were developed to disrupt the deficit ideology outcomes that are prevalent in education (…) One of the key examples of an asset-based pedagogy, culturally relevant/responsive pedagogy, was introduced by seminal figures such as Gloria Ladson-Billings and Geneva Gay during the 1990s to tackle the diversity issues in K-12 classrooms. Culturally relevant pedagogy is "a pedagogy that empowers students intellectually, socially, mentally, as well as politically by making use of social referents to present understanding, skills, as well as perspectives" in a formal education context (Ladson-Billings, 1994, p.17-18). Such an approach allows for an environment where unrepresented students can build upon their knowledge and cultural assets while engaging in critical conversations around their lives and communities (Aronson & Laughter, 2016). Another example of asset-based pedagogy is Moll and his colleagues (1992) 's funds of knowledge approach. Funds of knowledge are defined as "historically accumulated and culturally-developed bodies of knowledge and skills essential for household or individual functioning and well-being" (Moll et al., 1992, p.133). (…)

Drawing upon the parallels between the asset-based pedagogies and VTS, I argue that the characteristics of VTS can be leveraged as an asset-based tool in providing a culturally responsive museum-learning environment. Seminal researchers - Abigail Housen, a cognitive psychologist, and Phil Yenawine, a noted art educator, co-developed the concept of Visual Thinking Strategies, a curriculum designed for beginning viewers to find deeper meaning in a work of art and enhance visual literacy (Housen, 2002; Hailey et al., 2015). VTS stems from works of key constructivists like John Dewey, Jean Piaget, and Lev Vygotsky, which emphasized that learners actively build knowledge as a result of the interaction of prior knowledge, engagement with others, and new environments (Ishiguro et al., 2020). Moreover, it reflects an essential feature of constructivist art museum learning, which emphasizes "what is learned to be confirmed through external criteria of the discipline, such as art history, but through the visitor's own sense-making mechanism" (Mayer, 2005, p.14). (…) The VTS curriculum suggests the role of teachers or museum educators to transform their role into a facilitator for the group of viewers or students. The facilitator guides the group through sequential learning opportunities to produce evidentiary reasoning (Housen, 2002). In the silent looking stage, viewers are prompted to take a moment to observe an artwork, followed by open-ended questions such as "What is going on here?" "What makes you say that?" and "What more can we find?" (Housen, 2002). Instead of simply asking "What do you see?" which may have a definite answer, VTS prompts students to bring their stories to interpretations of what is happening in the picture. Then participants are encouraged to listen, share, and accept various interpretations while actively deriving meaning from applying their prior knowledge and cultural background to the visual information presented in the work. In this process, it is crucial for facilitators to be active listeners and participants, acknowledging

everyone's observation and interpretations as equal and validated through various techniques (e.g., reiterating, paraphrasing, pointing, creating an environment where people feel comfortable voicing their opinion, staying away from imposing experts' opinion on the students). Through this visual and critical thinking process, students are given opportunities to wander independently to discover what is important to them and reflect in a safe place (…)

Leveraging conversational agents to implement VTS in virtual museums for teens

To present its unique collection database in a creative, interactive way and to attract more online users to their virtual museums, several cultural organizations have turned to information and communications technology (ICT) and artificial intelligence (AI) technologies. Some prevalent use of ICT in museums include digital guides, smart tags, and smartphone apps. However, studies have shown that the lack of natural interaction in ICT refrain visitors from continued engagement and even disrupts the visitors' experience (Varitimiadis et al., 2020). AI technology has been introduced to provide more human-like interactions that allow for a more friendly, interactive museum learning environment. Chatbot is one of the AI applications that has been rapidly evolving and used in various disciplines world-widely. This section explores different technologies, including AI applications, and existing solutions to expand VTS as a culturally responsive online art museum education tool to provide a more relevant, democratic, and approachable atmosphere that overcomes restrictions of space, time, and location (Foo, 2008).

Related technology

1. Artificial intelligence and chatbots

Chatbots, also known as conversational agents, chatterbots, artificial conversational entities or talkbots, are "computer programs that conduct human-like conversations through auditory or textual methods" (Boianno et al., 2018, p.164). With their roots in artificial intelligence, chatbots use natural language processing to produce a natural conversation that allows machines to bridge the gap between human communication and machine learning. Outside of museum contexts, conversational agents have also been explored and incorporated in a wide range of fields, from commercial to e-learning environments. Chatbots have been shown in studies to be capable of fostering reflection and metacognitive skills, as well as providing personalized support based on people's strengths, interests, and talents, provoking more engaging, continued, and autonomous online learning (Kerly, Elllis & Bull, 2008).

2. Natural Language Processing

Natural language processing is one the most complex systems of AI chatbot technology. This is due to the dynamic and constantly evolving nature of language. In order to provide more human-like and inviting responses, machines are taught to segment, connect meanings, and evaluate natural conversations, using AI techniques like language parsing, speech and entity recognition, and sentiment analysis (Varitimiadis et al., 2020).

3. Machine Learning

Machine Learning refers to the use of supervised or unsupervised algorithms that enables computer systems to "learn" and continue to develop autonomously (Varitimiadis et al., 2020). Through different algorithms (e.g., deep learning, neural networks, decision trees), machines acquire the best ways to solve problems. Programming behind Conversational Agent utilizes machine learning to analyze the users' input and intent in real-life based on the algorithms that exposed them to numerous potential questions, reactions, and comments.

Existing solutions

Send Me SFMOMA

San Franciso Museum of Art (SFMOMA)'s "Send Me SFMOMA" initiative, which utilized SMS chatbot technology, was designed by Creative Technologist Jay Mollica to increase transparency and accessibility, as only 5% of the collections are on display at the museum. Any users could text "send me" followed by

an emoji or brief description of what they would like to see, and the SFMOMA's SMS chatbot would text related images pulled from the museums' collection. Since its creation from June 2017 to its end of service in February 2020, this creative content museum project texted over 6 million artworks to its users and went viral several times on social media that their servers crashed (Snyder, 2020). This is a great example of utilizing simple chatbot technology to approach a wider museum audience in a more friendly way to the museum's permanent collection. The success of this initiative reflects how similar methods can be designed for teens, who are heavy users of mobile devices, which has potential to bridge the emotional and physical disconnect between teens and art museums and provide a more relevant space of exploration.

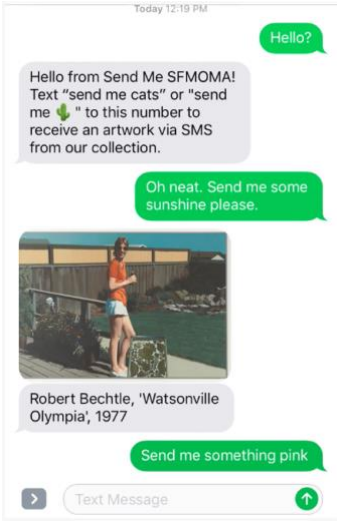

Figure 1.
Note: Image taken Send Me SFMOMA article. SFMOMA, 2017 (https://www.sfmoma.org/read/send-me-sfmoma/).

'Bot of Conviction' at the Catal Hoyuk Neolitic site

Based on a research question of "Can a chatbot enable us to change our conceptions, to be critically reflective?" Maria Roussou and her colleagues (2019) developed and implemented their "bot of conviction" at the Neolithic archaeological site, which was purposely chosen to trigger conversations around provocative topics (p.1). Her team utilized a Facebook Messenger chatbot to produce meaningful conversations around more challenging themes such as death, gender equality, privacy, and poverty. Based on advanced manipulation of machine learning and natural language processing, the 'bot of conviction' offers not only simple Question & Answer interaction but also can lead a conversation around the broader topic of public concern, encouraging reflection and emotional engagement. For instance, the bot of conviction is able to initiate and challenge the user through unexpected questions such as "How would you feel if your grandmother was buried under your bed?" (Figure 2). These radical and surprising questions, reinforced by follow-up questions, were intentionally designed to provoke critical reflection and action (Roussou et al., 2019). The findings around the implementation of chatbot technology to lead harder and more complex conversations reflect the effectiveness of continuous engagement with the user. Although this solution uses chatbots in a different type of cultural site, this study clearly demonstrates how cultural organizations can utilize chatbots to mimic more challenging interactions in discussion of multi-layered topics while using the VTS techniques.

Figure 2. Screenshot of Roussou et al. (2019)'s chatbot implementation, 2019.

Future implications

Building upon the related technologies and existing solutions, I propose leveraging conversational agents in online museum education for underserved adolescents. The aim of this educational solution is to suggest art museums go beyond the current status of technological use by introducing new ways of incorporating AI technology and VTS, by providing a more targeted approach of VTS to serve teens from minority backgrounds, and by creating a safe, relevant and interactive space of exploration. Although there is limited scholarship around implementing VTS using conversational agents and other technologies, the various creative and related efforts being made across disciplines suggest the feasibility and positive potential this solution may bring to online art museum education for teens.

In proposing an online-based educational solution, I acknowledge that there are limitations of unequal access to the internet, Wi-Fi, or necessary devices. At the same time, there are continuous efforts made by various non-profit organizations such as Big Thought, which partnered with Dallas Mayor's office to connect local low-income youth with both human and digital resources (Daniels, 2016) and public libraries to provide access to Wi-Fi and computers. (…)

Conclusion

There is broad concern in the scholarship that acknowledges the underrepresentation of the Black, Latinx, and Asian population and the discriminatory history of U.S. art museums. In the twenty-first century, institutions are taking essential steps closer to tackle the issues of inequality and discrimination. These steps include investing in the field's diversity by hiring Black and Latinx curators and staff beyond just janitors and security positions, establishing community advisory committees. The ongoing issues of authority and representation contribute to the dwindling attendance and lack of participants from this population. In the review of the current practices of museums – both in physical and virtual spaces – this capstone reveals gaps that remain to offer a culturally validating, inclusive, and relevant experience for teens from underrepresented communities.

By connecting the existing solutions and technology, the educational solution offers insights into utilizing conversational agents to implement VTS in virtual museum learning settings designed for teens. At a minimum, this research intends to bring more awareness to the art museum's role as a critical educational tool for underrepresented adolescents and the need to take continuous actions for inclusion and diversity through difficult conversations. The audience for this research is museum studies scholars, art museum staff, and user experience designers. These individuals include key decision-makers or stakeholders who determine policies or efforts around diversity, equitable participation, and inclusion in art museum education.