# "Breaking the Canvas"

## A Serious Game to challenge stereotypes
## in Visual Culture through Fine Arts

SeleniaAnastasi[1,2], Daniele Zolezzi[3]

[1] Università degli Studi di Genova, Italy – selenia.anastasi@edu.unige.it
[2] Language Technology Group, Department of Informatics, Universität Hamburg, Germany
[3] Università degli Studi di Genova, Italy – daniele.zolezzi@gmail.com

**ABSTRACT**

How are minorities portrayed in visual culture and art history? A large body of literature addresses this question (O'Kelly, 1983). However, relatively little attention has been paid to the potential use of this knowledge as an effective educational tool to raise awareness of social issues in educational contexts. The increasingly widespread digitization of education, the availability of online resources for exploring museum heritage, and circulation of structured and open data could represent an opportunity to experiment with innovative educational projects aimed at promoting themes such as inclusion, equity, and ethical use of new technologies. In this study, we move in this direction by proposing a digital tool to achieve these objectives. To do this, we refer to already established approaches for analyzing gender stereotypes in art history and apply them to the educational framework known as a Serious Game. Our contribution is therefore twofold. First, we provide a theoretical and critical reflection on the state of the art of educational digital approaches to the study of artistic heritage from an inclusive perspective, considering the possibility of addressing a relatively young student target. Second, we provide a practical solution by proposing the architecture of an educational game designed for middle and high school students. The game will be introduced and tested in classes to support educational projects for inclusion through art history education.

**PAROLE CHIAVE**

Serious Game, Fine Arts, Media and Visual Culture, Inclusion and Equality, Virtual Assessment

## 1. INTRODUCTION

In recent years, themes such as *inclusion* and *equality* have occupied a crucial position in the international agenda, even with the rapid digitization of society. While the development of digital educational approaches, the availability of new resources, and the growth of European initiatives to face social injustice have increased in interest among government institutions and the private sector, these efforts still need to be challenged in daily practices. Indeed, virtual and real violence against women and other marginalized groups and embedded stereotypes in Western culture continues to grow[1]. To raise awareness and shift societal norms is to provide adequate educational resources to young individuals still receptive to learning and establishing moral values [1][2].

Increasingly, leading museums and cultural institutions around the globe adopt digital tools to support learning for young visitors, but how can we assure the same educational strategies in places where access to seats of culture is not guaranteed?

---

[1] https://eige.europa.eu/gender-statistics/dgs.

In order to ensure equal access to resources that educators can integrate both traditional knowledge and the latest ethical matters, in this work we propose the game design of a Serious Game dedicated to the study of stereotypical representations of minorities' identity through critical education in visual culture and fine arts.

Traditionally, issues related to stereotypical roles have been widely discussed in Critical Cultural Studies and Postcolonial Studies applied to Fine Arts, and the review of the literature available in these fields exceeds the scope of this work[14][13]. However, at least two main approaches to education on inclusion in the arts can be traced from the reference literature. These approaches are discussed in more detail in section 2, together with a brief state of the art of knowledge background involved in the development of the game design.

In section 3, we show how we apply the theoretical background to the design of the game prototype, exploring its architecture, expected learning outcomes, the serious game approach involved, and exemplary case studies. In section 4, we briefly conclude by indicating the next stages of development of the project and the upcoming experimental setting, in order to assess the game experiences of adolescents and young adults, as well as the educators in the school context. Through our design, we intend to make the knowledge acquired useful in everyday life, characterized by the dominance of visuality.

## 2. ENGAGED EDUCATION, VISUAL CULTURE, AND VIDEO GAMES

Scholars in the Social History of Art and Cultural Studies have heightened the role of Cultural Heritage and visual experiences as a form of self-awareness. In this perspective, in the cultural system, artifacts are entangled in relationships with other objects and subjects, places, processes, and practices. Past events depicted in a work of art acquire relevance by understanding the context of their origin and their genealogy, including the history of how concepts such as gender, race, and class have been conceived over time. Given the possibility offered by open data and query systems, digital tools are configured as natural means to support this inquiry in education practices [9][10].

To strongly emphasize the role of education in critical reading of artistic and intellectual productions, among many others, it is important to cite the American philosopher bell hooks. From her situated experience as a black woman, the scholar starts a general reflection on the importance of practices of cultural re-visioning, starting from a marginal, subaltern point of view. For hooks, teaching is a performative act of liberation that, far from reinforcing systems of exclusion, must offer the world a concrete space for change. Thus, classrooms become laboratories of virtuality in which the concepts of theory and practice cannot be addressed in isolation [11]. Therefore, crucial for the development of this project is the concept of *engaged pedagogy*: the conviction that teaching practice is not only about the sharing of information and notions, "but to share in the intellectual and spiritual growth of our students" ([12]:14). Bell Hooks' "standpoint" approach emphasizes the importance of teaching critical awareness, particularly for those marginalized and discriminated individuals who suffer from the conditions of intellectual isolation typical of the peripheries of the world. Furthermore, this approach questions the power dynamic present in the teacher-student relationship and thus seeks to construct a learning environment where both sides can learn from each other. This is important because hierarchical constraints can occur not only between teachers and students but also between students from different social classes and from different nationalities and cultural backgrounds. Thus, the bell hook approach restores the idea that education plays an essential role in the transformation of society, and educators should be selective in determining students' experiences. A proper selection of content is needed to enhance individual and social growth and lead to the empowerment of social minorities in everyday circumstances.

Following her path, the approach we intend to propose in this study focuses on the visual arts. In the tradition of Feminist Art History, the first level of analysis dealt with the under-representation of female artists and ethnic minorities within the Western artistic canon [13]. Within the same framework, Freed observes that "women artists have begun to be written into art history, but often appear as if injected into a story about *great men*" ([13]:158). Exemplary of this attempt is *Die Kunst der Gesellschaft 1900-1945*, a recent curatorial project of the Neue Nationalgalerie zu Berlin[2], which tries to overcome the glass roof of Modern and Contemporary Art by showing at least a female exponent for each dowel of the thematic path ranging from 1900 to 1945. Therefore, in this context, educating means asking if this is enough and bridging the gap constituted by access to these same

---

sources so that the museums of large European capitals are not a place of privileged access to knowledge. Some works that will be investigated within our game are inspired by this historical journey.

The second concern focuses on the stereotypical representation of genders and ethnicities in artistic representations over time. This theme is extensively investigated in the literature, and an exhaustive review of this topic is beyond the scope of this work. However, it should be noted that this educational approach, which places the reading and interpretation process at its core, works as a support not only for the institutional learning scopes, that is, understanding the History of Art, but also supports the idea that knowledge is an integral part of our daily social life. We live in a world where visual representation (drawings, pictures, photos) and videos spreading in social networks such as Instagram and TikTok play an even larger role in shaping morality in young individuals[3]. Thus, educating students to read the implicit messages hidden behind a famous picture stimulates a critical reflection both about the past and about the immediate present [14].

The same consideration led us to the third level of inquiry: how to educate young scholars to challenge the stereotyped representations of target groups within the mainstream media, the same media that reinforces and encourages the permanence of such stereotyped characterizations? [20]. This is particularly burdensome when looking at video game products. Just to name a few, the game Custer's Revenge (Mystique 1982) was one of the first examples of video games with stereotypical and racist representations within a video game. Despite the graphical limitations dictated by technical constraints over time, the game published for the Atari 2600 places the player in the role of George Armstrong Custer, an officer in the United States Army during the American Civil War, dodging naked the arrows shot by Native Americans to reach a girl tied up in order to rape her. Games such as Night Trap (Digital Pictures 1992), The Grand Theft Auto series, or Mortal Kombat (Midway Games 1992), which show extremely violent content, are also extremely popular. How can it be possible to hack the connection between violence and digital games and appropriate a medium that arouses interest due to its hurtful elements to educational favor?

Several recent studies in Gamification show that the educational power of digital games can be fruitfully involved in a process of raising awareness on issues of equity and injustice [21]. Gamification, or the use of game elements and game design techniques in a non-game context [5], has been shown to have positive consequences in raising the awareness of the user while also making them have fun. The inclusion of playful elements in daily or work routines engages users in their tasks and puts them in a state of flow [6]. As a result, the integration of playfulness into the learning process is becoming crucial for digital natives. Thanks to gaming elements, the task is perceived as pleasing and easy to remember, and the introduction of game quests has shown to be an effective tool for improving the acquisition of specific skills [7]. Understanding game mechanics can also be considered a form of education, and it was only a matter of time before video games became a part of institutionalized education [8]. Despite the tendency to sensationalize the issue of violence in video games more often than the effectiveness of educational methods related to them, we can state that the negative effects of video games would be more sporadic than commonly believed. In fact, studies show that there are more benefits than disadvantages in their consumption [22]. In our game, we question the privileged viewpoint of young gamers, challenging them to question their beliefs about the world and our past.

## 3. BREAKING THE CANVAS: GAME DESIGN AND MAIN PURPOSES

*Breaking the Canvas* is a quiz game designed to gain awareness among young scholars of stereotypes across Visual Culture and the History of Fine Art. To this aim, the game shows several famous paintings and challenges players to answer nontrivial questions related to the artwork. The purpose is twofold: on the one hand, to test the familiarity with the visual artifact by the player at different levels and on the other hand, to train the critical evaluation of the same object by activating a process of deconstruction of the image represented as a whole. The young scholar must notice the details hidden in the image and provide a single valid answer among the options. The difficulty lies above all in the fact that some of the options provided can be considered correct as well, but superficial in their critical readings of the artwork.

The first level of the game is dedicated to the recognition of the main attributes of the picture, such as data relating to the creation of the piece of art (year, historical framework, and artistic movement), information about the author, and the current location of the works. In this first phase, deep observation and critical reflection are not required by the students, as it is assumed that information is gained from the textbooks and/or made available by the teacher in advance. Descriptive documentation and metadata associated with the works currently cataloged within the platform are also made available to

---

[3] http://manovich.net/index.php/projects/instagram-and-contemporary-image (last visit 28/02/2023)

students as they progress through the game. As a bonus for correct answers, more information appears on the screen as a new piece of the puzzle immediately after the answer is provided, and in association with some salient elements depicted in the scene. This is not accidental, and the student should pay attention to the clues as they will become crucial in the second phase of the game. This ensures that the students answer the questions and focus on the details disclosed in the image, memorizing the contents continuously in order to pass levels and access new ranks.

The second level of the game rouses the recognition of more evident gender and ethnicity storytelling elements in the works of art. This level relies on the players' ability to store, understand and select information about the clues within the scenes, whether they are related to gender differences, race, or sexual orientation. Here the student is guided through thematic pathways called *frames* in which works of art from different historical periods and artistic currents are associated and compared with each other. This method makes the acquisition of theoretical skills in image reading immediately applicable, training the student to find points of continuity and break between the representations (see Figure 1). Just as with questions at the first level, after the correct answer, players will have excess textual elucidation about the history behind the image they are facing and the associated frame. The goal is to stimulate curiosity, reflection, and critical thinking around themes and works of art.



*Figure 1.* The frame "The nude reclined" shows three famous paints depicting figures of women in a very traditional pose. She is a goddess, odalisque, or a beautiful woman abandoned on a surface. From the left to the right: Eduard Manet, Olympia, 1856, Musee d'Orsay, Paris; Amedeo Modigliani, Reclining Nude, 1917, from a private collection; Evard Munch, Reclining Nude, 1912, Hamburger Kunsthalle, Hamburg.

Thanks to the framing storytelling, the students become familiar with the authors and the paintings as well as with the subjects and themes that have been established as canonical in Western figurative art. In the case of *the nude reclined* frame, for instance, the student acquires the ability to grasp the differences and similarities and the evolution of how the same subject is depicted in different historical periods, or by contemporaries influenced by different artistic waves (as in the case of Munch and Modigliani).

The approach we used mirrors the exploitative nature of the *explorer* archetype described in Bartle's taxonomy [22], constantly on the hunt for new discoveries and information. In order to provide support during the experience both for students and teachers in the classroom, the gamer is accompanied by a travel companion throughout the levels (a robot-shape figure named Helmo who will guide the gamer through the platform affordances). The so-called *call to adventure* [18] is Helmo's request to learn how to interact with others without generating stereotypes of any sort. The presence of the robot is useful in

creating a relationship within the game world, orientating the experience to an actual scope, and increasing the player's motivation to pursue the narrative progress that will emerge from their relationship. Every time the player answers correctly, Helmo will show joyful feedback and a message of congratulations, while if the player answers incorrectly, the robot will display a sad emoji and a message that will try to motivate the player to improve their responses. The choice to use emoji is driven by the desire to use a universal medium that can easily and immediately show the expressiveness experienced by our travel companion, making it clear to the user whether what they see on the screen is a positive or negative event. The player serves as a mentor on Earth for the buddy, but as the story progresses, the player also learns the concepts presented by the game alongside the robot.
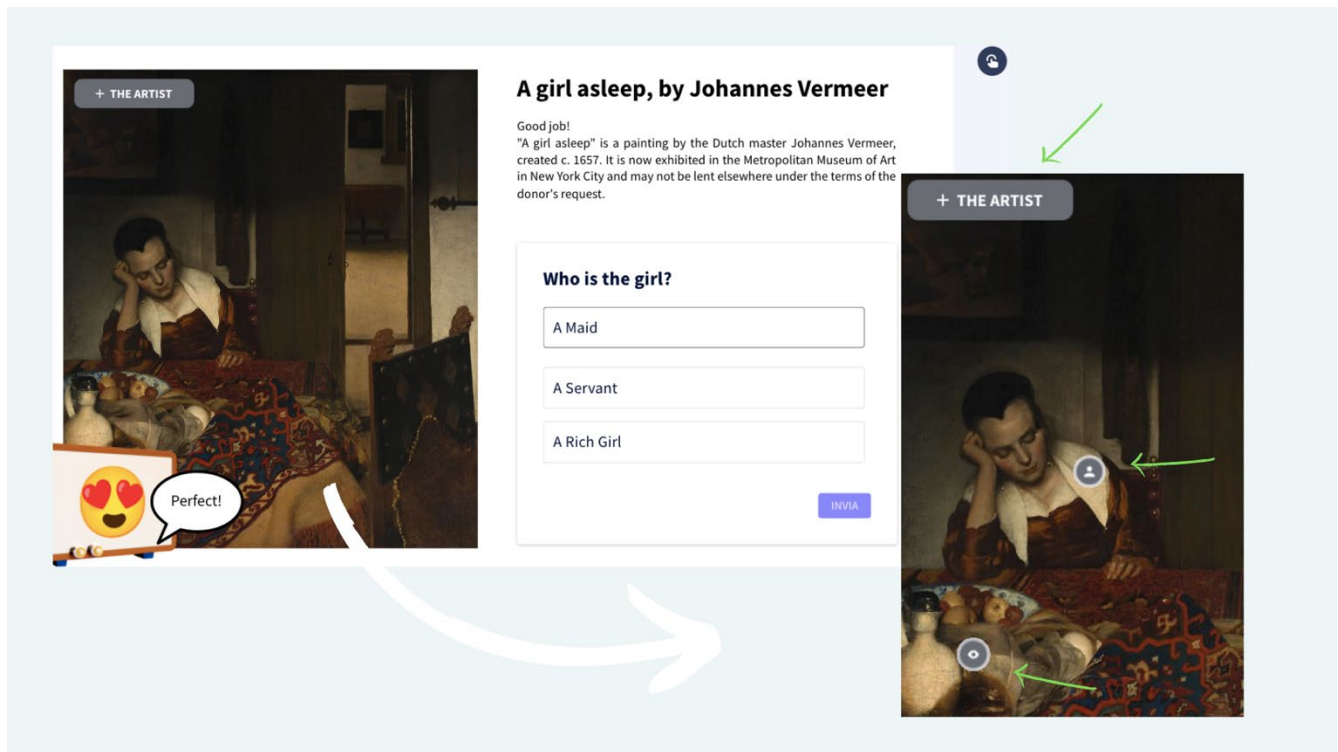


*Figure 2. An example of a frame that questions the figurative trope of the maid, as depicted in a famous painting. On the right side of the image, indicated by the green arrow, the suggestions that can appear directly on the image to provide the students with some insights into the artist and the work.*

Upon completion of the game, students will be tested on their mastery of stereotype analysis through an Extra Mode featuring AI-generated paintings. The aim here is to help both players and educators in testing the improvements about the topics. The frames presented in this section will be generated using *Dall·E 2*, an AI algorithm capable of creating images based on textual descriptions. *OpenAI*, as the creator of the algorithm, is dedicated to improving the inclusivity of its product by minimizing the risk of creating stereotypical biases when generating images [24]. However, the possibility of encountering cultural biases still present in the relatively young *Dall·E 2* algorithm is quite frequent in processing generic information [25]. The system can effectively comprehend human language and accurately produce user requests in various styles. The algorithm tends to make the most errors in generating images of complex scenes, where it struggles to accurately position all the described elements, resulting in incomplete images or misplaced elements with incorrect relationships [26]. To generate an effective educational image, the textual input must contain only a few precisely described elements. This not only prevents the algorithm from becoming confused by handling too many elements but also allows us to focus the students on the most important lessons within each proposed image. This tool was chosen to generate images to overcome two possible complications: 1. To provide contemporary examples without risk in violating the copyright associated with the reproduction of advertising and media materials; 2. To show how human biases can have a direct impact on the production of new knowledge and technologies.
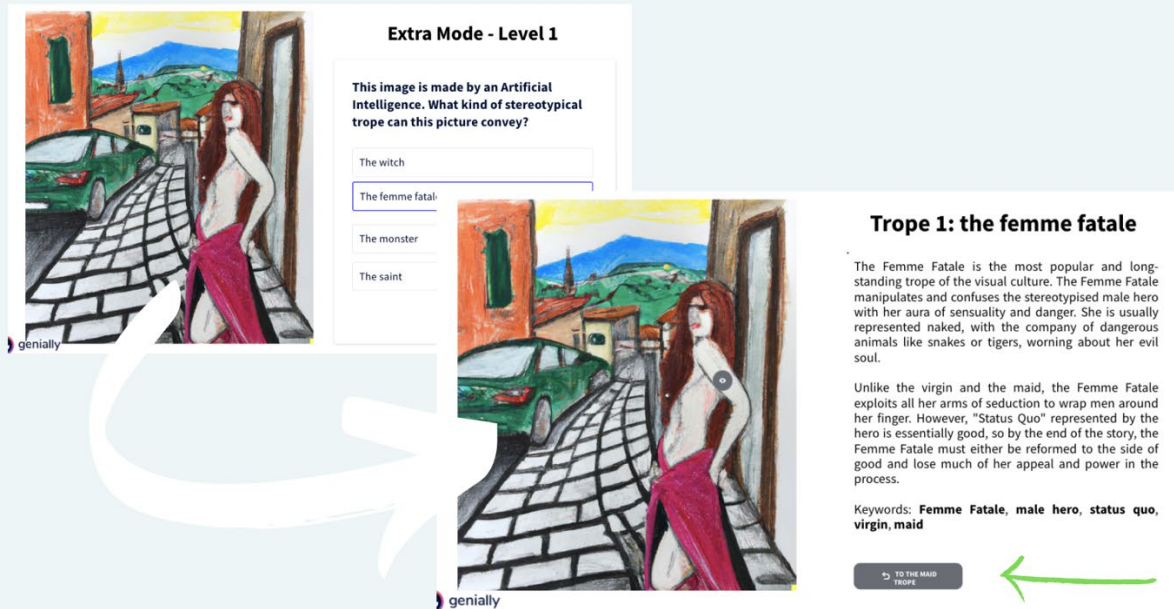
*Figure 3. An example of image generated by DALL E 2 to convey the trope of the femme fatale. It is possible for the students to navigate from the present page back to past pages by interlinks, as indicated by the green arrow.*

## 4. CONCLUSION AND FUTURE WORK

The project seamlessly integrates into art history courses, supplementing traditional academic teachings with a heightened focus on education and sensitivity. The game demo is currently available in the Genially environment, a web-based tool that provides templates for Gamification initiatives, easy to use both for teachers and scholars. Genially is user-friendly and highly customizable, granting developers the freedom to create even new educational content that supports hybrid teaching methods [23]. We employ this platform after a thorough examination of the target audience and the technological infrastructure provided by academic laboratory settings. It is common for such facilities to possess outdated equipment or lack the capabilities to support ultra-detailed and complex gaming experiences. Moreover, Genially is accessible on any device that can connect to an internet network, offering universal access at any time and place.

As further improvement of the present study, we plan to make the game independent from the Genially platform by developing an interactive environment designed to support the implementation of a Knowledge Base to expand the pool of pictures with sources from real public database, such as that currently provided by the Prado Museum in Madrid. The use of resources from museums and institutions is significant, because it underlines the effort to make cultural resources accessible inaccessible for many students all around the globe. Finally, we plan to test the demo first on high school students from different study curricula between Sicily and Liguria.

## BIBLIOGRAFIA

[1]  E. Chung and E. Turiel, Adolescents' judgments about resource inequality involving group disparities, Journal of Experimental Child Psychology 218, (2002).

[2]  S. J. Brose, C. Conry-Murray, E. Turiel, Adolescents' reasoning about parental gender roles, The Journal of Genetic Psychology 174 (2013) 207–224.

[3]  D. Michael, S. Chen, Serious Games: Games that Educate, Train and Inform, Thomson Course Technology, 2006.

[4]  C. C. Abt, Serious Games, New York: Viking Press, 1970.

[5]  K. Werbach, D. Hunter, For the Win: How Game Thinking Can Revolutionize Your Business, Whar ton Digital Press, 2012

[6]  M. Csikszentmihalyi, Flow and the Foundations of Positive Psychology: The Collected Works of Mihaly Csikszentmihalyi, Springer Netherlands, 2014.

[7]    S. Iacono, M. Coccoli, D. Zolezzi, G. Vercelli, Gamification di un video-corso sulle competenze informatiche di base: da Gli Irrinunciabili a Star Words, in: Teach Different! Proceedings to EMEMITALIA2015, Genova University Press, 2015, pp. 275–278.

[8]    T. Chatfield, Fun Inc: Why Games are the Twentyfirst Century's Most Serious Business, Virgin, 2011

[9]    S. Anastasi, A. De Domenico, M. Nicolosi-Asmundo, (2022) Egith-engendering data. Steps towards an ontology for the representation of gender in cultural heritage, in: 1st Workshop on Artificial Intelligence for Cultural Heritage, AI4CH 2022, CEUR-WS. org, 2022, pp. 13–25

[10] P. Jaskot B., Digital art history as the social history of art: Towards the disciplinary relevance of digital methods, 2019.

[11] b. hooks, Insegnare a trasgredire, L'educazione come pratica della libertà. Meltemi (2020).

[12] b. hooks, Teaching to transgress. Routledge (2014).

[13] L. Nochlin, Why have there been no great women artists?, ARTnews (1971).

[14]  K. Freedman, Interpreting gender and visual culture in art classrooms, Studies in Art Education 35 (1994) 157–170.

[15] C. McCormack, Women in the Picture: Women, Art and the Power of Looking, Icon Books, 2021.

[16] M. Prensky, Digital Game-based Learning, McGrawHill, 2001.

[17] A. Kapriyelov, Representation of women in video games, Liverpool John Moores University/Liverpool: Liverpool Screen School 37 (2015).

[18] L. Castillo-Cuesta, Using Genially Games for Enhancing EFL Reading and Writing Skills in Online Education, International Journal of Learning, Teaching and Educational Research 21 (2022).

[19] C. Vogler, The Writer's Journey: Mythic Structures for Screenwriters and Storytellers, M. Wiese Productions, Studio City, CA, 1992

[20] D. Williams, N. Martins, M. Consalvo, J. D. Ivory, The virtual census: Representations of gender, race and age in video games, New media & society 11 (2009) 815–834.

[21] T. G. Deskins, Stereotypes in video games and how they perpetuate prejudice, McNair Scholars Research Journal 6 (2013) 5.

[22] M. Rickards, F. Vannucchi, Il videogioco. Mercato, giochi e giocatori, Libri per la comunicazione, Mondadori Università, 2013

[23] R. Bartle, Hearts, clubs, diamonds, spades: Players who suit MUDs (1996)

[24] N. Hermita, Z. H. Putra, J. A. Alim, T. T. Wijaya, S. Anggoro, and D. Diniya, 'Elementary Teachers' Perceptions on Genially Learning Media Using Item Response Theory (IRT)', Indonesian Journal on Learning and Advanced Education (IJOLAE), vol. 4, no. 1, pp. 1–20, 2021.

[25] OpenAI, 'Reducing bias and improving safety in DALL·E 2'. 2022. [Online]. Available: https://openai.com/blog/reducing-bias-and-improving-safety-in-dall-e-2

[26] F. Offert and T. Phan, A Sign That Spells: DALL-E 2, Invisual Images and The Racial Politics of Feature Space, 2022

[27] G. Marcus, E. Davis, and S. Aaronson, A very preliminary analysis of DALL-E 2, 2022.