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Early Implementation of AI-generated Art in TESOL: An Exploration of AI-generated Art for Language Acquisition

Morgan J. Moody[1]
[1]*Global Teaching Institute, Tokyo International University, Japan*
mmoody@tiu.ac.jp
Victor A. Lopez[2]
[2]*Global Teaching Institute, Tokyo International University, Japan*
lvictor@tiu.ac.jp
Phillip R. Johnson[3] *
[3]*Global Teaching Institute, Tokyo International University, Japan*
pjohnson@tiu.ac.jp

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Corresponding author

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ABSTRACT: *This article will broadly discuss art generated by artificial intelligence (henceforth AI-generated art) and its utility in language acquisition contexts in education, options among various text-to-image AI tools currently available, effective use of Midjourney (the AI system used by the authors), legalities, potential issues, and further thoughts. As publicly available text-to-image end-user applications are relatively nascent, literature on this subject is lacking, especially in terms of pedagogical implementation. We hope that by introducing the educational possibilities of AI-generated art, the discourse surrounding both art and technology in the classroom can be expanded and introduced to a wider academic audience.*

KEYWORDS: Artificial Intelligence, Art, Augmented, Computer-Assisted, Language Learning, L2, Midjourney, Motivation, TESOL, Vocabulary, Writing.

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Using Digital Technologies in an L2 Learning Context

The use of technology in the classroom is known as Computer Assisted Language Learning (henceforth, CALL); its use is not trivial either, as Shadiev & Yu note (2022): "[t]he use of technology plays an important role in language and culture learning." Lamb et al. (2021) noted that the usage of digital media can be enjoyable for people of all ages, especially younger generations. There is innate fun involved in the use of digital media in learning. With the use of digital technologies, users are given unique opportunities to express their creativity and exercise decision-making skills. All users, including language learners, are able to increase their ability with specific technologies; this allows them to strengthen their communication skills, resulting in learners who are able to engage with other language users in ways that are more personal, creative, and impactful (Chapelle & Sauro, 2020; Thorne & May, 2020). Lamb et al. (2021) further discuss the positive net influence of motivation and personal welfare gained when three fundamental psychological needs are met with the use of networked environments. The three needs are defined as "autonomy (volition and personal agency), competence (the sense of self-efficacy) and relatedness (being socially connected to others)" (p. 3). We argue that text-to-image emergent AI will likely find a unique and positive niche as a subset of CALL, as its use has elements linked to intrinsic motivation.

Lamb et al. (2021), in their review of various reports related to language-learning and development, focused on those activities that were found to contribute to intrinsic motivation. Ryan and Deci (2000) define motivation as follows: "[t]he term extrinsic motivation refers to the performance of an activity in order to attain some separable outcome, and, thus, contrasts with intrinsic motivation, which refers to doing an activity for the inherent satisfaction of the activity itself" (p. 71). Lamb et al. (2021) further expand these definitions by indicating that intrinsic motivation is created through meaningful and enjoyable experiences, in contrast to external motivation, which is created by external incentives or influence and lacks interesting or entertaining experiences. In the discussion of motivation, the authors highlighted various factors that act as influences, such as validation seeking, the ability to recognize future uses of the target language, and the opportunities that digital technology gives users for the purpose of being engaged in a more authentic manner when encountering target-language interactions. As we shall later discover, text-to-image AI tools have several elements that align with these intrinsic factors, particularly the novelty of the images.

According to Ramseier's (2001) interpretation of Schiefele & Schreyer's (1994) explanation of motivation, "[r]esearch has shown that intrinsic motivation and similar motivational constructs lead to more favourable learning behaviours and outcomes, for example, higher levels of creativity, better conceptual learning [...], deep-level processing (elaboration, use of metacognitive strategies), and higher achievement, whereas extrinsic motivation is a weak or nonsignificant predictor of learning and seems to foster superficial forms of learning" (p. 422-423). Additionally, Benabou and Tirole (2002) explain that offering rewards may act to undermine a student's intrinsic motivation in the future, especially in situations wherein they are involved in similar activities, as this type of extrinsic motivator might indicate to the students that the instructor has a low level of confidence in the student's abilities or suitability for the activity.

While this critique of extrinsic motivation has major implications in various contexts, Ramseier (2001) notes that the differences between these two forms of motivation may not be entirely applicable when looking at school-based educational contexts. A perception of one form being advantageous and the other detrimental might be an unhelpful classification as schools have diverse courses within educational institutions. It cannot be expected that students

will enjoy or take interest in each class or subject. Ramseier's discusses how reductively framing extrinsic motivation as being worse than intrinsic led to an important insight: "...learning at school is directed toward a future situation and aims at a goal which is separable from the current action. If students realize that it is of value for them to learn a certain subject because of its potential future use, this is an instance of extrinsic motivation" (Ramseier, 2001, p. 423). We believe that the use of Midjourney (the AI tool used by the authors) or similar emergent/future text-to-image can effectively elicit both intrinsic and extrinsic motivation; the anticipation of watching an image render and seeing a novel and interesting finished product contribute to intrinsic motivation, while the artifact itself and the longer-term associate skills gained through Midjourney-related activities – directed and contextualized expansion of vocabulary, concision in writing, and writing AI prompts, for example – may constitute extrinsic motivation for some language learners. Ramseier (2001) also noted that this contextualized and future-use-oriented form of extrinsic motivation could be seen as preferable to students being impelled to learn decontextualized knowledge without any motivational perspective. While motivation has shown to be an important factor in education and CALL, learner mindset may also influence its effectiveness.

While the popularity of CALL has been increasing as internet-enabled devices are becoming available to language learners, students may hold different beliefs about the efficacy and utility of CALL (Ayres, 2002; Stevens, 1991; Vandewaetere & Desmet, 2009; Wiebe & Kabata, 2010 as cited in Zarrinabadi et al., 2022). Research has indicated that most opinions regarding the effectiveness of CALL are positive (Zarrinabadi et al., 2022). According to the study performed by Zarrinabadi et al. (2022), learners with a fixed mindset (believing that one's language ability cannot be meaningfully altered) had a negative evaluation of the efficacy of CALL while those with a growth mindset (believing that one's language ability can improve through strategies and effort) perceived it positively. Furthermore, the authors of the study found that those learners that persisted in their efforts gained value from CALL and that consistent interest indicated the degree of enthusiasm toward CALL. They concluded that "learners' implicit theories and psychological characteristics play a significant role in the extent to which they believe in the usefulness and effectiveness of CALL and the extent to which they utilize it for language learning" (Zarrinabadi et al., 2022; p. 13). This indicates that the efficacy of CALL is not based only on the technology itself or its implementation, but is also dependent on the mindsets of learners. This has broadly important implications on the utilization of technology in the educational context. The efficacy of text-to-image AI tools in education may also therefore depend on the degree to which students have this "growth" mindset.

What Is AI-generated Art?

Terminology of AI art concepts and of what constitutes AI art generally have rapidly evolved since 2020 as a result of text-to-image AI products proliferating in 2022. Chen et al. (2020) defined "AIart" as "...an artistic activity where artists, scientists, engineers, art robots and audiences use AI as the core medium to create, express thoughts and emotions, spreading truth, kindness and beauty" (p. 49). References to the possibility of audience participation in the creation of AI-generated art were also made. However, the emergent end-user text-to-AI programs such as Stable Diffusion, DALL-E, and Midjourney, wherein audiences are irrelevant, were not discussed. The article also introduces a monograph (Li & Wang, 2017, as cited in Chen et al., 2020) referencing an AI expert who expressed doubt over the quality of AI art in terms of its ability to overmatch human art as a result of its output being likely based on

algorithms and stores of images. This doubt seems to not have been vindicated, as in 2022, an image produced by text-to-AI program Midjourney, with subsequent Photoshop editing, won first prize in a Colorado State Fair's fine arts competition, creating online backlash (Harwell, 2022). The definition of AI art has expanded beyond the comparatively speculative language of 2020, and been contextualized into its recent, emergent forms as end-user products. ADP's Tech & Innovation Blog simply defined AI art as "...any artwork created *partially* [emphasis added] or entirely by artificial intelligence… in most cases, AI art is generated by algorithms" (Chiu, 2022). Artland Magazine similarly defined AI art (albeit more broadly) as "art generated with the assistance of artificial intelligence," later making reference to the use of algorithms as well (Hencz, 2022). The inclusion of algorithms in definitions of AI art seems to have become more prominent, perhaps indicating that what constitutes AI art is becoming more well-defined and in keeping with the modern, colloquial use of the term, and may indicate that the aforementioned algorithms are no major hindrance to producing human-like art.

AI-generated art, as a new subset of digital art, is already disrupting other fields, including law, labor, and ethics. Various organizations have created AI systems that can produce new images, often utilizing hundreds of millions of referent images from the internet. In 2022 The Economist used AI-generated art on the cover of their June 11 issue. The organization used a so-called "foundational model," a subset of deep learning algorithms "trained" on publicly available data – pictures, in this case. The Economist (2022) analogously explained the technology as mimicking the organization of neurons in the brain of humans in order to create images, also calling the technology revolutionary, as it is able to identify symbols embedded in the [English] language, and seems to use them in creative ways (The Economist Newspaper, 2022).

In an article published on Wired Media Group's Ars Technica webpage, Edwards (2022) describes Stable Diffusion, an open-source text-to-image AI model similar to other AI art generating tools, as an "image synthesis model" which allows users to create a visual representation of various imagined objects and scenes. The model can produce images making use of a vast diversity of artistic styles and mediums, including those of various well-known artists. End-users of these AI art-generating tools can thereby produce images according to their preferences, limited mainly by an individual's ability to "prompt," a novel colloquialism signifying a user's text inputs. This can therefore allow those lacking visual arts skills to create art at a quality that they could not normally reach. As Midjourney and DALL-E 2 use a similar system, this notion is applicable to all of the systems discussed in this article. The value of these tools in the greater art community has yet to be a matter of broad consensus, but their use as educational tools may be less controversial depending on the specific tool used.

Comparing Available Options

The authors believe it is important to discuss the different options among text-to-image AI tools that are available as of the writing of this article. Major tools as of this writing include Stability AI's DreamStudio, OpenAI's DALL-E 2, Google's Imagen system, and Midjourney. As there was a paucity of information available in regard to DreamStudio and Imagen, we will mainly discuss Stability AI and its associated Stable Diffusion, DALL-E 2, and Midjourney.

Stability AI and Stable Diffusion

According to Cai (2022), Stable Diffusion is a popular system that creates digital images from a text prompt input by a user. It was developed by the startup company Stability AI in collaboration with RunwayML and is open source, which allows individuals to have free access to its source code. Founded in 2020 by Emad Mostaque, Stability AI has received a large amount of support within the AI community due to the CEO and founder's decision to have the system open-source, allowing for many organizations to utilize it in their own resource and program development. Mostaque explained that Stability AI was created as a for-profit corporation in order to allow the system to reach more people and avoid influence from outside forces, for example billionaires and governments (Cai, 2022).

Stability AI (n.d.) states on the front page of their website that they are "[d]esigning and implementing solutions using collective intelligence and augmented technology" and that their open-source AI tools will let "us reach our potential." Stability AI has several developer communities, collectively containing over 20,000 members, composed of experts, Stability AI partners, and leaders around the world. These diverse communities are not only creating open AI models for images but also those related to audio, video, language, video, biology, and 3D.

DALL-E 2

DALL-E and DALL-E 2 were developed by Open AI, an artificial intelligence research and deployment company which has made its mission to "ensure that artificial general intelligence (AGI)—by which we mean highly autonomous systems that outperform humans at most economically valuable work—benefits all of humanity" (OpenAI, 2021). The original iteration of DALL-E was introduced in January 2021 on the Open AI webpage and DALL-E 2 was announced in April 2022 (OpenAI, 2021). In contrast to Stability AI, OpenAI chose not to share their source code with the general public, citing the possibility of misuse (Strickland, 2022).

Strickland (2022) further explains that around 650 million images compiled from the internet were used to instruct DALL-E 2's system, which allowed it to learn the relationships between images and associate words used to describe them. The Open AI team sifted through the image set in order to remove overt depictions of hateful or sexual content and violence, lowering the chances of the system synthesizing images containing such content. According to OpenAI researcher Mark Chen (Strickland, 2022), it is extremely unlikely that DALL-E 2 would create anything [inappropriate] it has not seen through its training but it still has the potential to create material that could be deemed harmful. We note that similar statements on safety measures have been made by leadership with regard to the other aforementioned text-to-image AI tools. In connection to this, OpenAI intentionally programmed DALL-E 2 to not perfectly reproduce faces in the synthesized images as a method of preventing nefarious content such as deepfakes (Strickland, 2022).

Midjourney

In an article written for The Register, a well-known technology news website, Claburn (2022) interviewed Midjourney founder David Holz to discuss his project and the future of AI art generation. Holz describes Midjourney as "a social network for creating AI-generated art from a text prompt," which differs from DALL-E 2 in small but impactful ways. In this article, Claburn links to a tweet by a participant in various multimedia AI groups that claims Midjourney is more "contextually creative," having excellent textures and *more beautiful imperfections* [our emphasis] than DALL-E 2, the latter of which functions more precisely with

clearly-defined prompts from the user (fabians.eth, 2022). Similar to DALL-E 2, Midjourney has preventative measures related to violence and sexually explicit imagery. In its *Terms of Service*, Midjourney requests that its users avoid creating images that are upsetting or distressing to others, noting that prompts using inappropriate language may be blocked (Midjourney, n.d.-b).

Uniquely, Midjourney is, as of the date of this article, hosted on the Discord instant messaging/social media platform. Discord is a website that is used to communicate with other individuals online and includes various methods of communication such as VoIP and instant messaging. Users can create their own servers, which are initially private and inaccessible to other users until invitation links are provided to them, through which the new users are then added to the server. Therefore, if used in a pedagogical context, access to the server could be limited to instructors and/or administrators, enabling the former to produce images on behalf of the students while maintaining student security.

Currently, Midjourney uses a "freemium" business model that rewards paid subscriptions with expanded functionality. As noted in the Billing and Licensing section of Midjourney's *Code of Conduct*, if a user purchases a $20 dollar/month "Private Visibility Option" or a $30 dollar/month "Standard Membership" with Midjourney, text prompts can be made to a Midjourney 'bot' that the user invites to a private server (Midjourney, n.d.-a). In order to ensure the anonymity and security of students, instructors could generate images by copying prompts written by students on a private Discord server inaccessible to other users. No personal data will be connected to the images and, excepting the content of the text prompts themselves, there would be no way to connect the images to any individual other than the instructor-as-user, safeguarding student privacy.

Authors' Preferred Tool

After weighing the available options, the authors of this article decided that Midjourney was the best option for their own classroom purposes. The rationale for choosing Midjourney in their teaching context was based on five reasons.

The first reason is informed by research into L2 motivation. While "autonomy" as defined above by Lamb et al. (2021) is inherent to multiple text-to-image AI tools through the use of "prompts" (the text inputs), Midjourney may offer users more in terms of competence and ways of engagement with the AI in its ability, through "weights," to change the interpretive freedom the AI is given.

The second reason is that the hardware and software elements are outsourced insofar as the processing work necessary to generate an image is not performed locally on one's own computer and there is no need to download anything. All one needs are Discord and Midjourney accounts to perform this activity.

The third reason is that, at the time of writing this article, DALL-E 2 utilizes a credit system to pay for using their services. New users receive 50 credits for free, with the option to buy an additional 115 credits for 15 US dollars per credit. In order to sign-up to use DALL-E 2, user information, including a phone number, is required. Also, the images created by users of DALL-E 2 are property of OpenAI, but users are allowed to use and reproduce their generated images as long as they abide by the company's policies, the violation of which will result in the user losing their right to legally use the images they generated (Edwards, 2022). As noted above in the *Code of Conduct*, Midjourney uses a subscription model allowing for a greater number of text prompts that we feel is preferable to DALL-E's credit system, as the former allows for more free-style experimentation without the pressure of expending credits.

The fourth reason is Midjourney's style of prompting. Since the forthcoming pedagogical impact related to these tools is more focused on vocabulary acquisition than grammar, a prompting style which is more reactive to contextually independent keywords (like Midjourney's) was preferred over the more often syntactically colloquial prompting style of DALL-E. Midjourney's images tend to be weighted less towards photorealism, particularly when art styles are included in the prompts. In the authors' current classes, which involve interactive fiction writing, Midjourney's allowances for a less literal, more interpretive prompting style (due to aforementioned interpretive weighting scales) seem more reactive to tonal/mood prompts and are considered to be a better choice than photorealistic/literally-interpreted images, as it is speculated that the novelty of the less literal image results may be more strongly linked to students' intrinsic motivation.

Using Midjourney Effectively

In this section, suggestions and information will be provided in order to maximize the effectiveness of Midjourney in the classroom context. As previously noted, Midjourney is a text-to-image AI tool which uses prompts as its form of input. Based on information in Midjourney's *Tips for Text-Prompts*, before writing a prompt, it would be helpful to determine how much interpretive flexibility is acceptable for the user with the image generated. One factor to consider is that the less specific the prompt, the more interpretive freedom is given to the AI when taking into account the user's text input (Midjourney, n.d.-c). Within Midjourney's FAQ, there are a great deal of helpful tips provided in a linked document called *A Guide to Writing Prompts for Text-to-image AI*. This guide helps new users better optimize their prompts with suggestions such as including artistic mediums (e.g. papercraft, plastics, oil painting), avoiding the use of negatives (e.g. "not" or "without"), and avoiding too many details (Holz, 2021). It is recommended that new users read these provided documents, as well as the large number of other resources that are becoming available online in the form of video tutorials, articles, and social media posts.

Utility in Education

This section will outline potential uses of Midjourney or other AI art generators in the English classroom. In an open-discussion-styled "office hours" held on Discord in Midjourney's official server, David Holz stated the following: "I feel like it's less important in education to give knowledge than curiosity and confidence… in this case, it's probably most important to expose [students] to the technology early and let them feel positive about it and work it into some project where they'll have an open mind to it in the future" (D. Holz, personal communication, August 17, 2022). Elsewhere in the same interview, knowledge of history and art were given as examples of types of knowledge that are being reframed in light of text-to-AI programs insofar as an expanded knowledge of them, used to increase the specificity of the text prompts, can afford a user greater control over the types of images produced. An artist with knowledge of historical artists and various artistic mediums will likely be able to produce images that are more variegated and novel than a user with little such knowledge. This shows how the three elements mentioned by Holz (curiosity, confidence, and knowledge) could, and perhaps should, be emphasized in the modern classroom in connection with implementing text-to-image AI tools.

Individuals with confidence in their own abilities enhance their [internal] motivation, which acts to augment those with low levels of willpower (Benabou & Tirole, 2002). Confidence in the types of knowledge relevant to AI art tools may thus be linked to motivation, particularly when it affects the quality of the image output. A study led by neuroscientist

Charan Ranganath at the University of California indicates that when an individual's curiosity is aroused, there are changes in the brain that prepares the individual to learn about the current topic as well as peripheral information that might be encountered in the learning process (Yuhas, 2014). Furthermore, the author suggested that this arousal of curiosity might aid educators in discovering ways for their students to better retain the information being conveyed in the classroom. Yuhas (2014) makes note that curiosity itself may not always be a completely beneficial experience. Neuroscientist Marieke Jepma of the University of Colorado, Boulder, found that the experience of curiosity could create negative feelings in an individual, as the brain may not provide the desired rewarding feeling until the curiosity has been satisfied; Ranganath suggested that it is analogous to an unscratched itch (Yuhas, 2014). Curiosity may not always be a mental state that is rewarded with a feeling of satisfaction, but as the process of using Midjourney has a concrete ending, the image, framed as "the result of one's prompt". The more novel and interpretively open images generated by Midjourney might thus be preferable in this context of the satisfaction of curiosity.

As discussed above, we believe that Midjourney could function as a learning tool that increases both intrinsic and extrinsic motivation among language learners. As AI art generators are relatively new, they could be perceived by students as a novel and exciting tool providing a unique experience. The ability to use written English to create an image may pique student curiosity on a larger scale (e.g. the aforementioned art and historical knowledge) thus increasing internal motivation and possibly adding to the less immediately enjoyable external motivations inherent in an educational context. On a smaller scale, waiting for images to render and then viewing the final product could act as a complete cycle of arousal and satisfaction of curiosity. After planning, writing, editing, and submitting multiple prompts, students may begin to feel more confident not only in their general language skills but also with regard to their vocabulary and creativity levels. The use of Midjourney or similar programs used in various ways could thereby provide an enjoyable, motivating experience.

An example of an image generated by a student using Midjourney can be seen in Figure 1 below (student permission given):

Figure 1
Summer Fireworks



Note. Midjourney prompt: beach, festival, summer, fireworks, take a movie scene, night, Japanese style, beach house, love comedy

Therapeutic Aspects

Text-to-image AI tools may have therapeutic elements in an educational context worthy of consideration. Therapy is intended to physically or cognitively heal; "expressive writing has healing benefits because it increases self-understanding and insight," and its ability to lead participants towards academic realizations is similarly emotionally relevant in terms of its role in the therapeutic process (DeSalvo, 2000 as cited in Beaumont, 2018, p. 55). Providing an outlet for individuals to physically manifest emotions into writing can be an attribute of personal journaling, but a similar result can be achieved in the classroom. "A desire to express oneself through writing is as natural and universal as the need to connect and to be understood (Beaumont, 2018, p. 55). The main objective for doing so, in the context of AI-generated art from writing prompts, is to increase internal motivation through the visual medium of art.

AI-generated art relies on the user, and "art, in and of itself, is incomplete and that it is in the linkage of visual to verbal that consciousness or insight is won" (Whitney, 1993, p. 2). By extension, written communication can facilitate that connection between the production of art and the user's realization of their creativity. Accessing prior knowledge and prior experiences elicits the words that drive the creation of the image. The conveyance of a student writer's personality being of importance (Robbins, 1987, as cited in Whitney, 1993) may extend to the emergent "authorship" of the prompts necessary to produce AI images. Classroom environments can be intimidating for students, and it is through the softening of those edges with the familiarity of inner narratives, rendered graphically in this case, that emotional investment is made.

Therapy, and art therapy specifically, calls for the individual to reflect, verbally or otherwise, on their thoughts and graphical representations thereof like a reflective writer after composing. The editing process that produces innate language, would otherwise conceal that intrinsic meaning and the exercise of meaning making itself, which equips the individual with increased problem-solving skills that can be self-regulated (Beaumont 2018; Whitney, 1993). A concurrent series of events takes place wherein an eventual astute conclusion drawn in the form of an image is achieved by means of moving through the stages of writing (Beaumont, 2018). The connection between process and product is itself a metacognitive process, created by the manipulation of a piece of writing or prompt intended to be graphically represented by AI. Discovering what exists in one's written description, what is lacking, and what can be added to benefit the eventual piece of visual art is an autonomous journey that is reflective and therapeutic.

Metaphoric language remains hidden in one's subconscious if it is withheld an outlet, or in this case a written process and subsequent visual artifact. The classroom instructor is meant to "ask students to write about what matters, encourage idiosyncratic perspective and language, [and] allow talk of reflection on feeling" (Whitney, 1993, p. 4). When a student considers how they make choices in their writing, whether subconsciously or consciously, unseen lines are drawn between points that connect concrete with figurative expression. Ideally, as with most forms of therapy, a goal is for the individual to become autonomous in their direction, which results in the instructor becoming a facilitator. External influences, such as the facilitator or cultural implications based on pre-determined contexts or constraints in the assignment such as course objectives, must be reduced through encouragement in favor of expressing and emphasizing one's own maturation in creative perspective (Whitney, 1993). To this end, an instructor should be wary of putting too many constraints on the students' AI prompting process, encouraging autonomy.

Introverted individuals may face impediments with self-expression, but practice in reflective writing affords students an internal environment that is accessible only to themselves. These skills are critical in the exploration of that form of visual and written expression, which might have otherwise been absent in the reticent participants of this type of endeavor (Bolton & Delderfield, 2018, as cited in Beaumont, 2019). Self-care and self-awareness are integral to an introvert's actual and perceived success, and the benefits of written and visual expression can increase that likelihood. It may be beneficial, therefore, that the prompting process be preceded with reflective activities such as brainstorming and visualizing.

Vocabulary Acquisition

Text-to-image AI has already motivated its casual users to expand their English vocabulary, yielding a dearth of video and text tutorials being posted on YouTube, Twitter/X, and other platforms.

> ...make it your goal to speak to Midjourney as concisely as possible. This tip has actually forced me to improve my vocabulary and try to express myself better. Before prompting, I spent time on Google searching up things like 'what is another word for animal with human body features?' And the answer, by the way, is anthropomorphic, and that will give you much better images of animals with human bodies… (cyankatana, 2022, 1:35).

Casual Midjourney users are not the only potential beneficiaries of AI art technology for vocabulary acquisition, however. It may also help students on various vocational paths to learn new terms relevant to their future professions. Zhang et al. (2022) noted that the positive results with CALL were found within the widely-researched realm of English for Academic Purposes; in one such case, an online medical dictionary developed by students whose collaborative elements included uploading translations, definitions, and, most significantly to this article, images. In their own research, they found that CALL is used more often to learn the decontextualized meaning of vocabulary instead of the use and form of the terms. This indicates that CALL can aid students in gaining passive and receptive, rather than an active and productive understanding of vocabulary (Zhang et al., 2022). While this might affect the way CALL is used in the standard educational contexts, Midjourney used as a tool for vocabulary acquisition may not have this shortcoming if it is used to supplement or augment a writing assignment where the productive and active use of vocabulary is necessary. In addition, Zhang et al. (2022) noted that their research showed that CALL is considered to assist vocabulary acquisition activities utilizing metacognitive and cognitive strategies, while affective features and compensation strategies are not supported.

As noted throughout this article, the words used when constructing prompts for Midjourney are important in making the resultant image (Holz, 2021; Midjourney, n.d.-c). According to Nielsen (2022), "the more descriptive you are in your text, the more vibrant and unique the output will be." This indicates that the subjective "quality" of the image output is more or less directly related to a student's word choice. In other words, Midjourney can be used by students to create imagery revolving around newly-learned or instructor-dictated vocabulary words. Conversely, the creation of prompts might give impetus to students to independently learn new words as well as synonyms of known vocabulary. In this way, the use of Midjourney can aid in the acquisition of non-core vocabulary for the sake of improving prompts, and potentially yielding more exact renderings of what students imagine when desiring to generate an image.

As for examples of vocabulary activities using Midjourney, students could be instructed to create prompts to depict scenes using specific vocabulary words from textbooks, instructor-

generated lists, or some other source. There could be a pre-set theme or other pre-determined restrictions. Additionally, students could be assigned to write prompts that describe episodes from a short story or novel being read in class. Students could paraphrase and simplify passages from a text, determine key words and phrases, and finally rewrite the desired depiction concisely in the form of a Midjourney prompt. This would be highly applicable in a course that includes a standardized test preparation component (e.g. TOEIC, TOEFL, IELTS) wherein students are expected to practice the skill of scanning texts for keywords related to main ideas or details.

Instructors could use AI-generated art tools to create copyright-free images of vocabulary words, scenes from books, or historical events to be used as supplemental materials. It is important to note that, when writing prompts, users should avoid vague concepts that would require the AI to engage in a large amount of extrapolation to generate an image; the enjoyment of novel images is a benefit, but over-vague prompts may yield unsatisfying results. If instructors use Midjourney for materials creation, this must be kept in mind to ensure a clear representation of the vocabulary or concept being taught to students (Midjourney, n.d.-c). Interestingly, by guiding students towards the avoidance of unclear language in their prompts, the importance of audience engagement in writing is instilled; that is, more detailed language generally leads to a more informed reader.

Artists, Art History, Styles, Mediums

When using Midjourney, receptive and productive skills, specifically reading and writing, can be developed through the support of Midjourney and other AI tools that generate art through text input. Students can include names of specific artists in the prompts in order to have the image generated with the appearance of having been created by a specific artist in their characteristic (or rather, algorithmically probabilistic) style. Prompts are not limited to using only one artist, so students can experiment by combining the styles of multiple artists, even ones of greatly contrasting styles. Allowing students to experiment with the styles of various artists will provide them with a sense of freedom to find a unique and interesting combination that could increase the pride and feeling of success felt when creating new images. Beyond specific artists, prompts can also include styles (e.g. Studio Ghibli, sketch, and infographic) and mediums (e.g. watercolor, LinoCut, and acrylic).

The customizability of the image output in Midjourney could be used as an opportunity to teach art history, styles, and mediums in educational contexts outside of traditional art classes. It could augment language education, creative writing, or any other project-based classwork making use of language and images, and any level of digital art or design classes. An example of its viability as a tool to integrate art history into an English class could be that the instructor assigns a text such as Romeo and Juliet; as this story was first published in the Renaissance period, students could be instructed to research the various artists and art styles prominent during that era. Instructors could provide scaffolded research activities that would help students learn the most relevant information of the era and select art styles and artists to experiment with while generating images depicting scenes from the text. An example of an image generated by the authors of this article using Midjourney, inspired by the novel *Madame Bovary*, can be seen in Figure 2 below. This could also be used with fairy tales, encouraging students to learn about artists such as Theodor Kittelsen or John Bauer, then creating retellings of a specific fairy tale and generating art to accompany the text. As described in this subsection, educators can use Midjourney and other AI-art-generating tools as a supplement to reading and writing skills, integrated into various creative-academic assignments or projects.

Figure 2
A Midjourney-produced image inspired by Madame Bovary



Note. Midjourney prompt: thin pretty face madame bovary lookalike in a blue dress and french bonnet dreamily looking out a window with novel in lap, painterly, detailed

Legal Issues

According to Midjourney's *Code of Conduct* (Midjourney, n.d.-a), users essentially own the content that is created using Midjourney's chat and image systems. There are, however, two exceptions to this general statement. The first exemption is that "[i]f you are not a Paid Member, Midjourney grants you a license to the Assets under the Creative Commons Noncommercial 4.0 Attribution International License (the 'Asset License')." As outlined in the Creative Commons Legal Code (n.d.), this license binds creators and others that hold rights to their original works and materials to a set of standard terms and conditions. The license authorizes the creator to use their materials freely within the scope outlined in the terms and conditions. This allows educators and institutions to create and use copyright-free images for their own use. The creative commons license will allow for a near limitless ability to create new and unique images for classroom usage. Of course, users should be careful to avoid the use of otherwise copyrighted material, such as Mickey Mouse or other franchise characters.

The second exemption outlined in the *Code of Conduct* (Midjourney, n.d.-a), is related to corporate-use of the materials created using the Midjourney system. This might be relevant for those at a larger commercial institution as Midjourney stipulates that "[i]f you are an employee or owner of a company with more than $1,000,000 USD a year in gross revenue, and you are using the Services to benefit your Employer or company you must purchase a corporate membership plan to use the Services or copy the Assets for your company. Corporate membership plans involve an upfront, non-refundable deposit for up to 12 months of service." An important note is that the second exemption only affects those users creating materials to benefit the employer or the company.

Additionally, it is stated that the terms outlined by Midjourney are not final and will change throughout the process of the beta test of Midjourney. It will be important that users frequently check Midjourney's commercial terms in their code of conduct. Midjourney allows community members to use and modify any images and text prompts that are posted in the public servers on Midjourney's Discord. For this reason, the authors suggest that users purchase one of the private plans that are available. A relevant quote from Midjourney's *Terms of Service*: "If you... bought a privacy add-on to your subscription, we agree to make best efforts not to publish any Assets you make in any situation where 'Private mode' is engaged in the Services" (Midjourney, n.d.-b). The authors have a secure, private Discord server for this purpose.

Notable Issues and Controversies

Social Biases

With the use of technology in higher education, Cox (2021) notes that critical responses have included "issues such as the potential of technology to dehumanise the learning experience… often driven by… neo-liberal ideologies wrapped up in technology…" AI-generated art may reflect unaccountable biases in the images produced by it, the most frequent cases in education being "…gender and racial or ethnic skews" (Alon, et al., 2026). For example, innocuously generic input terms like "girl" may tend to favor the production of images reflecting ethnocentric bias, as shown in Figure 3 below.

Figure 3
A Girl



Note. Midjourney prompt: a girl

Mostaque (2022), posting on the Stability AI blog, explains how Stable Diffusion makes broad scrapes of data from the internet in order to create the synthesized images that result from the text prompt furnished by the user. As such, Mostaque disclosed that "the model may reproduce some societal biases and produce unsafe content, so open mitigation strategies as well as an open discussion about those biases can bring everyone to this conversation." The

issue of biases in Stable Diffusion's image creation is also found in DALL-E 2 (Strickland, 2022). This shows how AI is still susceptible to human prejudices and biases that might create controversy or upset users. As this is an issue inherent in both Stable Diffusion and DALL-E 2, one could extrapolate that this is common amongst all of these emergent types of text-to-image AI systems. Mostaque's disclosure opens a dialogue within related communities surrounding this potential issue upon the public release of Stable Diffusion, encouraging all to work together in order to temper this adverse element.

Linguistic Bias

According to Zverkova (2022), the image generated using an AI-art tool is affected by the input language. When an AI model is trained using the English language but the prompt is written in a foreign language such as Japanese, French, or Chinese, the resulting image may not be as accurate due to the possible issues arising from translation if the tool includes that ability (Zverkova, 2022; Monigatti, 2022). As a consequence, Zverkova (2022) recommends that in order to have the best results, prompts should be written in English if one uses Dream Studio, DALL-E 2, Stable Diffusion, or Midjourney, as they were trained using English. For example, the author notes that Stable Diffusion uses the LAION-5B database, containing "2.3 billion English image-text pairs and 2.2 billion image-text pairs from over 100 other languages" (Zverkova, 2022). The non-English text and image pairs allow users to write their prompts using characters from different alphabets, as well as emojis. No information was given about the ratio of image-text pairs that include non-English languages. While this indicates that one can write prompts in languages other than English, it may result in a less than desirable output.

Linguistic issues broader than language choice exist as well, owing to the various AIs' interpretive ability and ability to contextualize prompts. One DALL-E user, quoted by Strickland (2022), also commented on this broader interpretive gap that can occur between DALL-E and its end-users: "Working with DALL-E definitely still feels like attempting to communicate with some kind of alien entity… even if it theoretically understands the English language." The article also broadly framed these interpretive gaps in positive terms, as unexpected associations can lead to novel and interesting output. This, in turn, may further aid users in conceptualization and brainstorming processes, as associations not normally produced by humans are more likely to be produced. This could tie into Holz's remark about AI being an "imagination amplifier" (D. Holz, personal communication, August 17, 2022).

In regard to the process of assigning words to associated images in the AI learning process, we note that the associations made by the AI between words and images predate the AI tool itself. These English-language descriptors are already associated with the images on a socio-linguistic scale and may lead to linguistic/cultural biases in terms of image output. Shadiev and Yu (2022) explain that "[t]he interrelated nature of culture and language has received considerable attention. That is, understanding culture and cultural differences helps learners attain language proficiency effectively and vice versa." From a different perspective, a student's first language culture and the cultural differences between their first language and the target language could potentially create barriers to proficiency in the target language. This could be reflected in the use of AI technologies, particularly those that use the target language as the method of interaction with the tool.

As Whorf (2012) noted, a background linguistic system of languages (i.e. grammar) itself forms ideas, and is not merely a medium for them. This system also acts as a program that guides a language user's mental processes and analysis of the impressions experienced through interactions and experiences. The formation of ideas is not something done independently but is directly connected to grammar, which means that the process differs from

one grammar to another. One analyzes the outside world using the guidelines of one's mother tongue. The large amount of input that is collected through a person's experience is then organized largely by the linguistic system outlined by the aforementioned background system of language. A speech community is unified by the language and its internal (background) system and thus codifies and normalizes patterns within language and their ties to external impressions.

This concept could be analogically transferred to an artificial intelligence, sorting and processing impressions (images and linguistic data) that it is given. Linguistic backgrounds contribute toward a synthesization of mental processes and stored information (Whorf, 2012), and in this sense, the stock of images utilized by text-to-image AIs is metaphorically similar. What could be perceived as a domino-effect starts with the linguistic background system of the majority English-speaking programmers which in turn influences the way the AI is programmed and thus parses and organizes the content and the connections between vocabulary used in text prompts and imagery, which in turn affects the AI's output.

It is worth mentioning that the semantic relationships that the AI processes may be the standard descriptions that are set by societies and specifically from perspectives informed by the English language. As language and culture are inextricable, this may create a linguistic/cultural bias toward the English-speaking perception of the world, affecting the results of the image-generation process, especially for non-native users of English. As the text-to-image AI tools discussed in this article were trained using English, this is an important factor to consider.

Evidence indicates that technology is instrumental in language acquisition and familiarization with the culture of the target language (Shadiev & Yu, 2022). Although grammatically correct sentences are not required for writing prompts in Midjourney, the vocabulary used is important. When using Midjourney as a tool to expand core and non-core vocabulary, students occasionally will encounter synonyms in the thesaurus that a native speaker would intuitively understand as being limited to specific (potentially culturally-bound) circumstances. Instructors could take this opportunity to expand student knowledge in regard to how to contextually use the term correctly. For example, culturally-constructed color associations, the relative severity of various swear words, vague age-group identifiers such as "middle-aged," or translation of discriminatory language could all be problematic.

A Metaphor for the 'Collective Unconscious'

In Jung's definition of the collective unconscious, he alludes to dreams, fantasies, and fantasy images of an impersonal character which are difficult to explain on the basis of mere individual experience. Like the basic morphology of the human body, in Jungian psychology these images are *inherited* to a greater degree than they are based on transmission, tradition, or the particulars of an individual's life. Similarly, images produced by text-to-image AIs, trained on hundreds of millions of extant images on the internet, could be considered analogous to a visible representation of the collective unconscious, at least partially in terms of fantasy images if not dreams and fantasies themselves. Open source text-to-image AIs, being often less censorious than their more commercial counterparts, may potentially be used in the future as a means of engaging with the idea of the collective unconscious, which may be a useful lens through which to conceptualize AI in educational contexts. The image outputs received by end-users can be considered analogously as more individual manifestations of the "dreams, delirium, reveries, visions" referred to by Jung (1981, p. 155, paragraph 263). To engage with students on this topic may be far afield of typical coursework, but discussions of this type may lead to piqued curiosity and enhanced motivation to engage with these tools.

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Controversies

The authors of this article believe that it is important to discuss some of the controversies surrounding AI-generated art, examples of use, and how it operates.

In August of 2022, Jason Allen entered a print to Colorado State Fair's fine arts competition and won in the category of "digitally manipulated photography." When asked what materials or program he had used to create the digital image, he reportedly told officials of the state fair that he had used Midjourney but did not explain Midjourney in detail and they did not ask for clarification (Harwell, 2022). Harwell (2022) noted that when Allen began to discuss his success at the state fair, he received a strong negative response, including accusations of cheating and that this action could have serious repercussions, including the banning of AI-generated art and an increase in hate directed at Midjourney and other tools. While the controversy spread online, at the time that Harwell's (2022) Washington Post article was published, there had not been any formal complaints over Allen's win and his competitors do not appear to publicly hold any ill-will toward the decision. While this event may not have a direct consequence on the use of AI in the classroom, if there is a general level of animosity toward such systems due to competitive contexts, it may affect how these tools' usage may be received by institutions and students alike.

There has also been controversy surrounding the method used by AI art systems to collect source images and its potential violation of the privacy of individuals and their intellectual property. As previously discussed, the images used to train image-synthesizing AI systems are taken from images scraped from the internet. Xiang (2022) posits that this could pose legal and ethical problems for the companies involved in creating and using AI-created imagery. One of the major issues highlighted in the article is that of consent; even if an individual did not agree to let datasets such as Large-scale Artificial Intelligence Open Network (henceforth LAION) use their images, as of yet there isn't an easy method to opt-out of the data collection process.

As European Union citizens are protected by General Data Protection Regulation, which is a law covering data protection and privacy, companies that operate within the European Union's borders are subject to this law. According to Xiang (2022), LAION will not remove an image if you do not appear in it, even if your name is contained in the ALT text in the data. Xiang (2022) does note that LAION provides a form allowing individuals to request the removal of any images that violate regulations related to protecting personal data. LAION describes itself not as a creator, but a collector of data and that they are not the offender in these situations but instead that it is "the internet at large that allows for the proliferation of nonconsensual and possibly copyrighted images" (Xiang, 2022). The author continues by indicating that LAION holds the position that it "has a layer of separation between itself and the photos it's scraping; it says that it is merely indexing links to photos and not actually storing them," which exempts them from any responsibility for copyrighted materials used by others in training their AI. The author further indicates that despite the claims that LAION makes, the violation of an affected individual's privacy is intensified by using images without consent to synthesize new images using these new AI systems (Xiang, 2022).

Zack Marshall, an associate professor at the University of Calgary, in an interview with Xiang (2022), expressed concern about medical photographs of patients being discovered in LAION datasets, as they are included in image search results on Google. Marshall also communicated with Tiffany Li, an assistant professor of law at University of New Hampshire, who discussed the use of images by AI and the legal issues surrounding the situation. Li felt

that many questions still remain in the discussion surrounding Fair Use, stating "What does it mean when you use images to train an algorithm? What sort of use is that? Is that similar to copying an image like you would with traditional arts? Or is it similar to making a new image that looks similar to the old image? So fair use is not super clear" (Xiang, 2022). Given the sensitive nature of medical data and different international standards of the legal privacy thereof, this element of training data for use with AI tools may be fraught with controversy.

Even though Stable Diffusion is "looking into" opt-out options for artists and other affected groups (Jarvis, 2022), this type of preventative action appears to be a mere palliative. From the information gathered while researching this technology, we believe that there is no effective way of stopping this type of "image-scraping" without shutting down image-sharing across the entire internet. Any nominal "opt-out" could be viewed as a means to prevent such companies from being sued by those who feel that their privacy or rights have been infringed by the data-collection process. It could be said that these tools are doing what humans can do, taking inspiration from an image, but in a far more expansive and effective way. The line between inspiration and copying is blurred in this sense, potentially making these issues difficult to write legislation for.

Conclusion

In the interview with Claburn (2022), Holz indicated that the degree to which the technological side of AI technology will improve is easy to predict but that the "human ramifications of that are so hard to imagine…[t]here's something here that's at the intersection of humanity and technology. In order to really figure out what this is and what it should be, we really need to do a lot of experiments." Where technology and pedagogy meet, it is important to consider the consequences of using new tools, perhaps especially with the rapidly-evolving field of artificial intelligence. Until now, using text-to-image tools has yielded similar results to traditional teaching methods in terms of learning vocabulary meaning, but in at least one case resulted in better contextual use with students recognizing and writing the target vocabulary in context (Dağdeler, 2025). While controversies continue to surface in connection with text-to-image AI, in domains as diverse as copyright law, social linguistics, representation, and the philosophy of art, the degree to which AI-generated art will intersect in education will likely yield opportunities that educators and researchers would be well-advised to follow.

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