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On Born Digital Artwork, New Drawing Applications, and New Opportunities: The case for preserving time-lapse in Procreate and Clip Studio Paint

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Abstract
Most scholarship surrounding digital art has focused upon established artists whose work is already being preserved; their value canonized either by inclusion in museum collections or digital repositories like Rhizome. Scholars tend to focus upon "complex digital artworks" like net art, time-based media, and electronic art, but these are only part of the larger ecosystem of born-digital artwork. A growing, major genre of digital art is drawings, paintings, and comics—often produced by younger, independent, and freelance artists who have amassed large followings on social media but have yet to garner the attention of museums. The cultural value of digital drawings and comics is evidenced by their popularity on social media (which can be interpreted as larger public interest), necessitating their preservation. This article is intended as a brief introduction to Procreate and Clip Studio Paint, providing comparisons of their features in respect to Adobe Photoshop, which has long been the industry standard in creative fields. Many scholars have expressed concerns about the complexity of preserving born-digital artwork and the contextual files that document its creation; however, this process may be simplified by taking advantage of newly introduced features in Procreate and Clip Studio Paint.

Keywords
Procreate, Clip Studio Paint, digital art, new media art, digital preservation, social media

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Introduction

Much of the scholarship surrounding New Media art covers the technical aspects of preserving complex digital artworks like net art, time-based media, and interactive electronic art; less scholarship has been devoted to preservation of digital comics, drawings, and paintings. Perhaps due to the perceived simplicity of these mediums in comparison, recent innovations to the functionality of digital drawing software, specifically those implemented by Procreate and Clip Studio Paint, have been largely overlooked, indicating that some may be unaware of the pitfalls and opportunities associated with preserving these types of artworks. One such opportunity is the added contextual value given to a digital artwork by the ability to record time-lapse video of the entire painting process, which is then embedded in the same file as the finished piece. The development of a built-in recording feature, currently unique to Procreate and Clip Studio Paint, was spurred by public interest expressed via social media. Procreate's developer, Savage Interactive, introduced the feature in late 2015 (followed by Clip Studio Paint in December 2020), less than two years after a video of artist Kyle Lambert's photorealistic digital finger painting of Morgan Freeman in Procreate went viral, receiving 2.5 million views on YouTube in a single day.[1]

This instance, one of several explored in this paper, demonstrates the role of social media as public forum, with virality being interpreted as evidence of public appeal or approval. The potential promise of viral engagement has not just impacted software development, but also how freelance digital artists utilize that software to appeal to their audiences and maintain a following on social media. Within the last decade, time-lapse recordings have become a popular genre of online content for revealing part of the artist's process or technique. This has exciting implications for future art historical research, as the field has traditionally relied upon static sketches or artist proofs to attempt to understand an artist's working methods. With time-lapse, it could be possible for historians to watch a piece being created in real time by an artist who passed away years prior. This article seeks to explore the relationship between digital drawing software development and social media, dissecting how independent artists use these tools to further their career, while also addressing possibilities for art historical research and archival preservation considerations. This article is not meant to be a comprehensive review, but rather, the start of a conversation. Further research on this topic is necessary to fully document the functionality of these programs.

Literature Review in Miniature

This argument may be better understood in relation to the larger archival conversation surrounding born digital artwork and artist working files. In preserving digital artwork, archivists frequently emphasize the value of contextual documentation, though its role is somewhat contested. A cursory review of the literature from the past 10 years reveals that some archivists conceive of artist working files as an essential tool for preserving the final work, while others have identified a blurred boundary between the final work and its documentation.

In the preservation of legacy artworks, Dianne Dietrich and Frank Adelstein place great emphasis upon using documentation to guide preservation and access according to an "artist's vision." The primary lens within which this "vision" is examined is technical documentation generated by archivists during preservation, rather than the original working files produced by the artist. The authors suggest numerous ways in which the files can inform what methods best provide

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[1] It should be noted that in 2013, the built-in time-lapse feature did not yet exist in Procreate, so the recording was likely made using a separate screen recording software, evident from the user-interface captured in the recording, which is not documented by the time-lapse feature included in current versions of Procreate or Clip Studio Paint. Rene Lynch, "Morgan Freeman's biggest role yet? Viral video of an iPad drawing," *Los Angeles Times,* December 3, 2013, accessed October 8, 2021, https://www.latimes.com/nation/la-sh-morgan-freeman-drawing-viral-video-20131203-story.html.

access. What is missing from the analysis is detailed descriptions of the structure or actual content of the working files. Documentation is secondary, separate from the final work.[2] Samantha Deutch and Sally McKay appear to set forth a similar conception of working files. They discuss the importance of preserving digital ephemera online, arguing that its value is comparable to traditional artist files. Online ephemera is considered the digital version of the analog—while there may be some additional functionality, there is no exploration or acknowledgement of how artists may share multiple versions of their work online, and what these additional versions mean in relation to the work.[3]

Other archivists have acknowledged how the infinite replicability and mutability of digital artwork complicates our conception of what constitutes the "final piece." Ruth Wallach states: "publishing a digital work no longer implies having a final, finished piece."[4] This assertion is further explored by Dušan Barok, et al., who recounted how preservation of complex new media artwork, "CHINESE_GOLD_2006," was complicated by folders that "contained the work's image files in multiple versions… the artists [selected] versions of these files for different publications and exhibition contexts."[5] When there are multiple crops, edits, and formatting variations of the same work, which is considered the final piece and which are merely production materials?

Awareness of the blurring definition between the final work and documentation of its creation deserves consideration when preserving digital drawings and comics, which may exist in multiple versions due to the constraints of the online platforms, such as Twitter and Instagram, that contemporary artists use. Each platform has different limitations upon the shape and size of images, and each makes use of an algorithm that encourages artists to post frequently in order to maintain a certain level of engagement. To meet the demand for frequent new content while adhering to the platforms' formatting requirements, artists have adapted strategies to alter their works either by sharing multiple cropped detail shots of the same piece, changing the resolution or color profile to avoid pixelation or muddied colors, or sharing incomplete works in progress. These "work in progress" posts (WIPs) have become a major genre of content, both for their ability to allow artists to keep up with the algorithm while working at their own pace, and also their evident popularity with followers.

Expanding upon the argument made by Wallach and Barok, et al., the WIP is tangible evidence of the blurred boundary between documentation and the final work. The WIP can take the form of an earlier version of a piece saved in the same project folder, a screenshot saved in the downloads folder, or a time-lapse video recording of the creation process. WIPs have immense potential research value, as demonstrated by the rise of platforms like Patreon and Ko-fi in which users can become "patrons" of an artist, providing a monthly monetary donation to access "behind-the-scenes" content. Popular incentives include access to an artist's working files or narrated time-lapse videos that describe the techniques the artist used to create a piece. WIPs, and more specifically time-lapse videos, have present value as learning tools for fledgling digital artists, though they also provide documentation of digital drawing techniques for future art historical research. While WIP files may pose a classification conundrum for archivists, the effort required to preserve this material is justifiable. A more in-depth introduction of the drawing programs that produce these

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[2] Dianne Dietrich and Frank Adelstein, "Archival science, digital forensics, and new media art," *Digital Investigation* (2015), 138, 140, 142.

[3] Samantha Deutch and Sally McKay, "The Future of Artist Files: Here Today, Gone Tomorrow," *Art Documentation: Journal of the Art Libraries Society of North America* (Spring 2019), 28, 39.

[4] Ruth Wallach, "Shades of Grey: Thoughts on Archiving Personal Born-Digital Collections of Ephemera," *Preserving the Immaterial: Digital Decay and the Archive* (Fall 2013), 17.

[5] Dušan Barok, Julie Boschat Thorez, Annet Dekker, David Gauthier, and Claudia Roeck, "Archiving complex digital artworks," *Journal of the Institute of Conservation* (2019), 97-98.

WIPs will provide the necessary foundation of understanding to fully explore their cultural impact and value as archival resources.

Digital Drawing Applications on the Market Today

       Much of the artwork circulating online today is born digital,[6] as digital drawing methods have become more accessible due, in part, to lowered cost barriers and relative forgiveness of the medium compared to traditional drawing methods (having an undo button is a wonderful thing).

       There are several options on the market for digital drawing software, including Adobe Photoshop, Procreate, Clip Studio Paint (CSP), Paint tool SAI, Corelle Painter, GIMP, and Blender, among others. Of these programs, Procreate, CSP, and Photoshop will be the focus of this article due to their relative popularity according to community polls (Fig. 2) and Google Trends searches (Fig. 3 and 4). Many archivists are familiar with Photoshop, but some may require a more complete introduction to the newer applications, Procreate and CSP. (See Fig. 1 for a comparison of the three programs.)

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[6] On Instagram, the hashtag "#digitalart" has 90.7 million posts and "#digitalartist" has 10.2 million posts. Software specific hashtags include: "#adobephotoshop" with 2.8 million posts; "#photoshop" with 46.2 million posts; "#procreate" with 21.8 million posts; "#procreateart" with 5 million posts; and "#clipstudiopaint" with 1.9 million posts.

Basic Statistics for Photoshop, Procreate, and Clip Studio Paint			
	Photoshop	**Procreate**	**Clip Studio Paint**
Released	1990	2011	2001 as Comic Studio/ Kurisuta in Japan; 2007- 2016 as Manga Studio in the West; 2016 to present as Clip Studio Paint[7]
Developer	Adobe	Savage Interactive	Celsys
Operating Systems	Windows, macOS, iPadOS	iPadOS, iOS	Windows, macOS, iPadOS, iOS, Android, Chrome OS[89]
Cost	Monthly subscription only: - $20.99 a month for Photoshop - $52.99 a month for the whole Creative Cloud.[10]	One time payment only: - $9.99 for tablet - $4.99 for Procreate Pocket on cellphone	One time payment for PC and Mac: - $49.99 for PRO version - $219 for EX version - $4.49 a month for one phone or tablet. Monthly subscription plan required for mobile.
Hardware	iPad, plug-in tablet and computer, (cell phone Adobe Photoshop Express)	iPad, cell phone	iPad, plug-in tablet and computer, cell phone, chromebook, Samsung Galaxy Tablet
Native file format	.psd	.procreate	.clip; previously .lip
Software features (non-exhaustive list)	- Cloud storage option through Adobe Creative Cloud - Manual saving - Files saved directly to device - Layers and layer effects - No time-lapse recording - Supports 3D drawing and editing for layouts or figures - Neural filters (AI powered photo editing)	- Cloud storage option through iCloud - Auto-Save feature - Files saved in app only - Layers and layer effects - Time-lapse recording available; embedded in same file as artwork - In-app reference companion window - No 3D modeling support - Known for simplified, intuitive user interface designed to work with touch controls	- Cloud storage option through Clip Studio Cloud Service - Manual saving; optional auto-save feature - Files saved directly to device - Layers and layer effects - Time-lapse recording available; saved as a separate file with the same name - Manage multiple pages in a single file (like .pdf) - Supports 3D drawing and editing for layouts or figures

Figure 1: Table comparing basic information about each drawing program.[7, 8, 9, 10]

[7] "Celsys Company History," *Celsys*, June 6, 2011, captured by the Wayback Machine January 7, 2021, https://web.archive.org/web/20110606085955/http://www.celsys.co.jp/en/company/profile/history.html.

[8] "Authentic manga & comics production on the iPad. Empowering manga creation with 'CLIP STUDIO PAINT EX for iPad' in a simultaneous worldwide release on the App Store," *Celsys* news, November 8, 2017, accessed January 7, 2021, https://www.celsys.co.jp/en/topic/20171108.

[9] "Release of Clip Studio Paint for Galaxy, the artist's app for drawing and painting, Available from August 21 in the Galaxy Store worldwide," *Celsys* news, August 6, 2020, accessed January 7, 2021, https://www.celsys.co.jp/en/topic/2020080601.

[10] Adobe switched to a monthly subscription model in 2013. "Adobe Accelerates Shift to the Cloud," *Adobe News,* May 6, 2013, accessed February 16, 2021, https://news.adobe.com/news/news-details/2013/Adobe-Accelerates-Shift-to-the-Cloud/default.aspx.

Adobe Photoshop has long been the industry standard for academically trained and professional digital artists. According to Adobe, "Over 90% of the world's creative professionals use Adobe Photoshop… Adobe Creative Cloud mobile apps have been downloaded over 449 million times."[11] This versatile application can be used for photo editing, digital drawing, graphic design, video editing, and short animations, among other tasks. However, many artists have expressed concerns that Adobe's monthly subscription model is cost prohibitive, causing them to explore other drawing software options.[12] Two drawing applications, Procreate and CSP, have since emerged as popular alternatives to Photoshop. Procreate has "millions of users and ... recently took No. 1 Top Paid iPad App [in the United States] for 2020,"[13] and has even been used by artists at Disney, Pixar, and Dreamworks[14] for concept sketches and storyboarding.[15] Procreate is most often used for drawing, painting, and simple animations. In comparison, CSP's developer, Celsys, claims that as of December 2020 the application has over 10 million users "of all levels... from digital art beginners to professional comic artists, illustrators, animators, and designers. It is also used in universities and vocational schools."[16] This app is most commonly used for comics and line art.

The combination of lower cost barrier, greater accessibility of platforms, and comparably robust functionality make Procreate and CSP popular with contemporary digital artists. In addition to these benefits, Procreate and CSP contain unique tools that artists regularly utilize to present alternate aspects of their work, beyond the static finished piece.
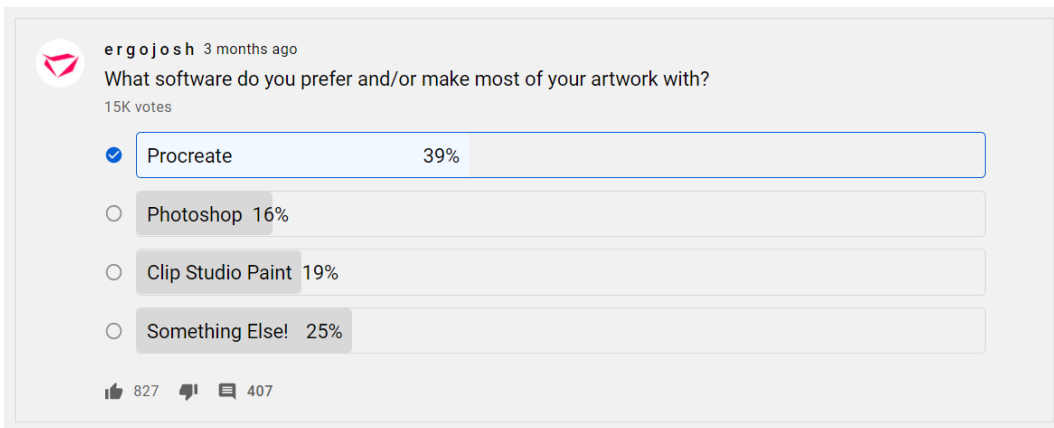

Figure 2: YouTube community survey of popular drawing software by e r g o j o s h, an artist and educational YouTuber. The poll had roughly 15,000 respondents as of August 15, 2021.

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[11] "Adobe Fast Facts," Adobe, accessed July 26, 2021, https://www.adobe.com/about-adobe/fast-facts.html.

[12] According to the U.S. Bureau of Labor Statistics, the median annual income for a freelance artist as of May 2020 was $52,340 before taxes, while the lowest average estimate was $19,570. Many smaller or early career artists may be earning on the lower end of this scale. "Occupational Employment and Wages, May 2020: 27-1013 Fine Artists, Including Painters, Sculptors, and Illustrators," U.S. Bureau of Labor Statistics, last modified March 31, 2021, accessed May 11, 2021, https://www.bls.gov/oes/current/oes271013.htm#nat.

[13] Katherine Galloway, Procreate Customer Support email to author, received December 8, 2020.

[14] Alex Dudok De Wit, "Procreate As A Storyboarding App? A Dreamworks Artist Explains How To Use It And Why It Works So Well," *Cartoon Brew,* July 14, 2020, https://www.cartoonbrew.com/how-to/procreate-as-a-storyboarding-app-a-dreamworks-artist-explains-how-to-use-it-and-why-it-works-194463.html.

[15] Procreate (@Procreate), "Have you seen these Disney artists using Procreate on the iPad Pro?" Twitter, October 6, 2015, https://twitter.com/procreate/status/651571361442344960.

[16] "Comic, illustration, & animation software Clip Studio Paint reaches 10 million creators worldwide," Celsys news, December 23, 2020, accessed January 7, 2021, https://www.celsys.co.jp/en/topic/20201223.
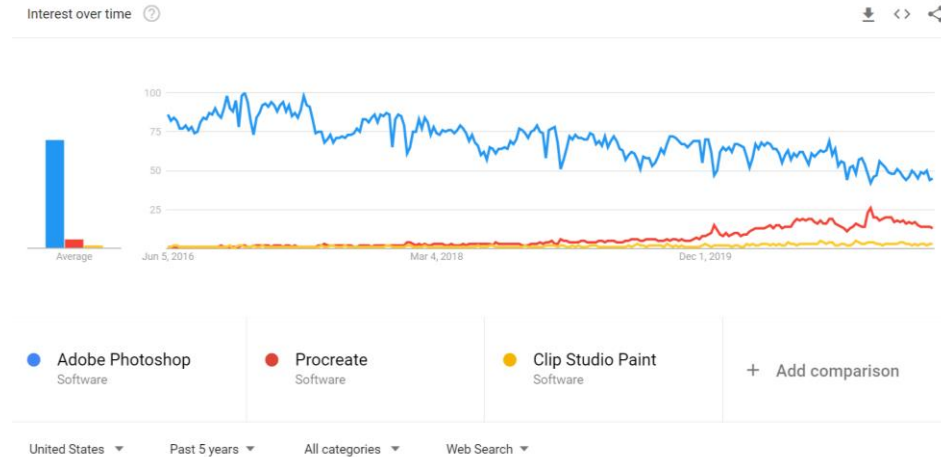
Figure 3: Google Trends Report of web search results for Photoshop, Procreate, and CSP from 2016 to October 2021 in the United States.
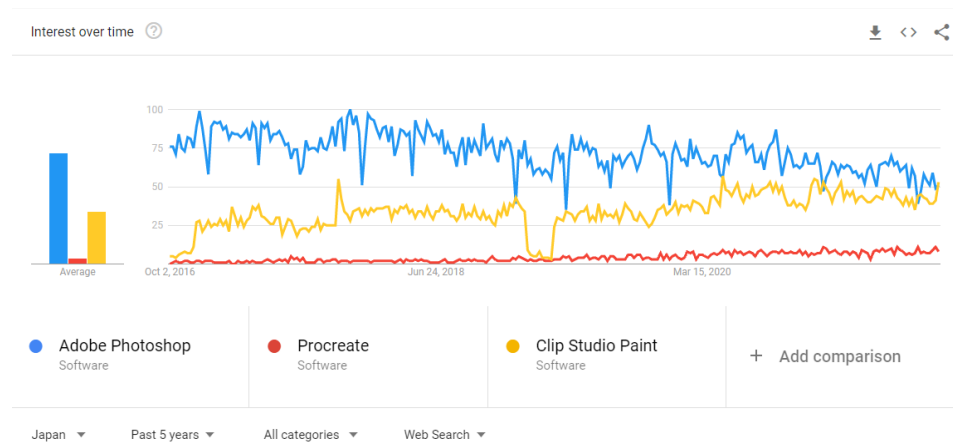

Figure 4: Google Trends Report of web search results for Photoshop, Procreate, and CSP from 2016 to October 2021 in Japan. Japanese in origin, CSP is a strong competitor of Photoshop, and is currently surpassing Photoshop in web searches.

How Drawing Applications Work and the Functionality of Time-lapse

Having established the popularity and general uses of Photoshop, Procreate, and CSP, it is worth comparing their respective features as drawing programs and the different ways in which their native file formats record information about a finished piece. Most drawing programs' native file formats work similarly. Native file formats (NFF) are the default format of a software program. Any file created in that program will be saved in that format by default, and (generally) can only be opened and used by that program.[17] NFFs are complex working files that have greater functionality than .jpgs, .pngs, or .gifs, which are often flat, one-dimensional objects. The NFFs in drawing programs are designed to record information about a work such as image layers, layer effects, clipping masks,[18] transparency, filters, and effects. They can support different color profiles like CMYK[19] and RGB,[20] rasterized text, and animations. Many programs, including Adobe Photoshop,

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[17] Because of Adobe Photoshop's ubiquity, there are some drawing programs, like CSP and GIMP, that can open and use Photoshop's native file format, .psd.

[18] A mask in digital art is a selected area that cannot be edited or altered. This is useful if an artist wants to apply an effect in certain areas, but not others.

[19] CMYK stands for Cyan, Magenta, Yellow, Black, which are the four colors used in printing images.

[20] RGB stands for Red, Green, Blue, which are the three colors of light that can be combined to produce any color. This is the color model used in web browsers and digital devices.

Procreate, and CSP, support these functions. There is notable research value in dissecting the working file to examine how layers, masks, and effects have been used. By analyzing a digital drawing's configuration, settings, and effects applied to the layers, or transparent sheets on different planes that stack on one another (Fig. 5 and 6), users may begin to develop a better understanding of the artist's technique.
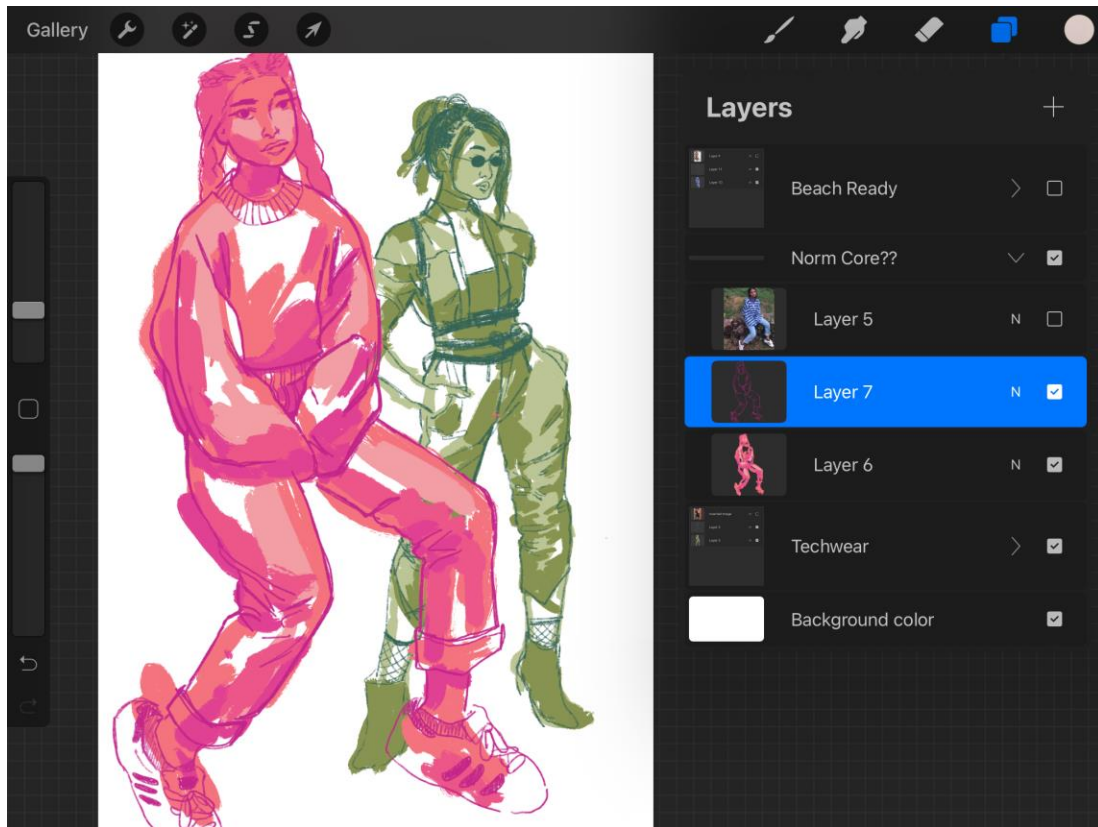
Figure 5: Figure study in Procreate by the author demonstrating layer use. Layers are transparent sheets that are "layered" over the canvas. Different layers may be used for lines, colors, or effects. As in real life, paint on a layer will cover up and hide any paint on the layers beneath.[21] In this example, "Layer 7" contains the line art which is above "Layer 6," containing the color. The checkmark on the right indicates that the layer is visible.

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[21] ClipStudioOfficial, "Basic Layer Techniques for Digital Drawing," Clip Studio Tips, July 17, 2019, accessed May 11, 2021, https://tips.clip-studio.com/en-us/articles/1882.

Figure 6: Example of layer functionality using figure study drawn by the author in Procreate. Left image features only the line art in Layer 7. Note that the colo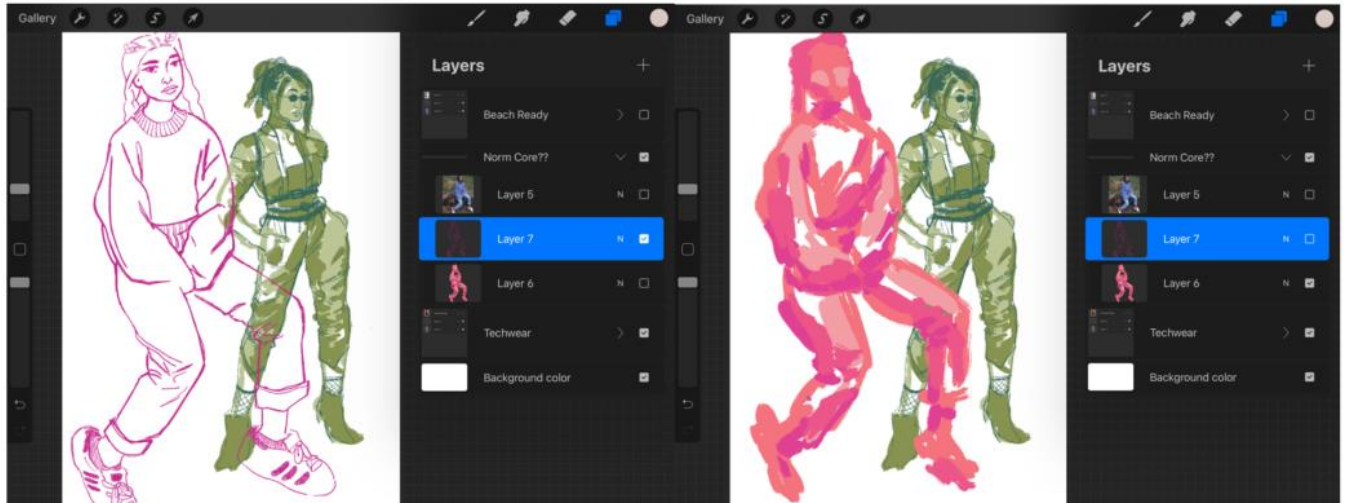rs on Layer 6 are hidden because the checkmark is not present. Right image hides the lines of Layer 7, revealing only the color in Layer 6.

This information has a multitude of uses: aspiring young artists can learn the "tricks of the trade" from more seasoned veterans; art historians can study the evolving sophistication of drawing programs over time by comparing working files; and publishers can return to working files years later to edit a specific layer for reprint. The layer information stored within a digital working file contains the context of its creation, which can be even more valuable than the finished piece itself. However, there are limitations to what we can learn just by looking at the layers associated with a single digital file. While users may be able to see all current layers, they will not be able to see deleted masks or individual layers that were merged. Cartoonist Maddi Gonzalez states: "You can't [always] tell what [techniques the artist] used on a layer. A lot of people merge their layers or combine them in the process [of finishing a piece]. You'll never get a full picture of the process just from looking at the layers."[22]

Beyond the ability to save layers, which has been a standard feature of most drawing programs for decades, Procreate and CSP provide even greater context for the creation of a piece by capturing time-lapse video of the entire painting process. Time-lapse enables viewers to observe recordings of brushstrokes as the artist made them, including portions of a piece that were reshaped, recolored, or completely erased. It should be noted that the built-in screen recording feature only records what is drawn on the canvas, not the entire user interface of the program. When time-lapse recordings are available, they can supplement information provided by layers to enable the viewer to contextualize the artist's process and techniques used to make a piece.

Procreate introduced the time-lapse feature in version 3, released in November 2015.[23] The feature is enabled by default in Procreate, but artists have the option to disable time-lapse recording. Time-lapse recordings are *embedded* in the .procreate file, but can be exported either as a 30-second video or "full length." Users have the option to review the video in-app, controlling the playback speed. CSP implemented the time-lapse feature in version 1.10.5, released on December 10th, 2020.[24] Unlike Procreate, CSP's time-lapse recording is saved as a separate file with the same name

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[22] Maddi Gonzalez (freelance cartoonist and illustrator), in conversation with the author, January 13, 2021.

[23] Katherine Galloway, Procreate Customer Support email to author, received January 20, 2021.

[24] "Main Improvements in Version 1.10.5," *Clip Studio Paint Release Notes*, December 10, 2020, accessed January 7, 2021, https://www.clipstudio.net/en/dl/release_note/.
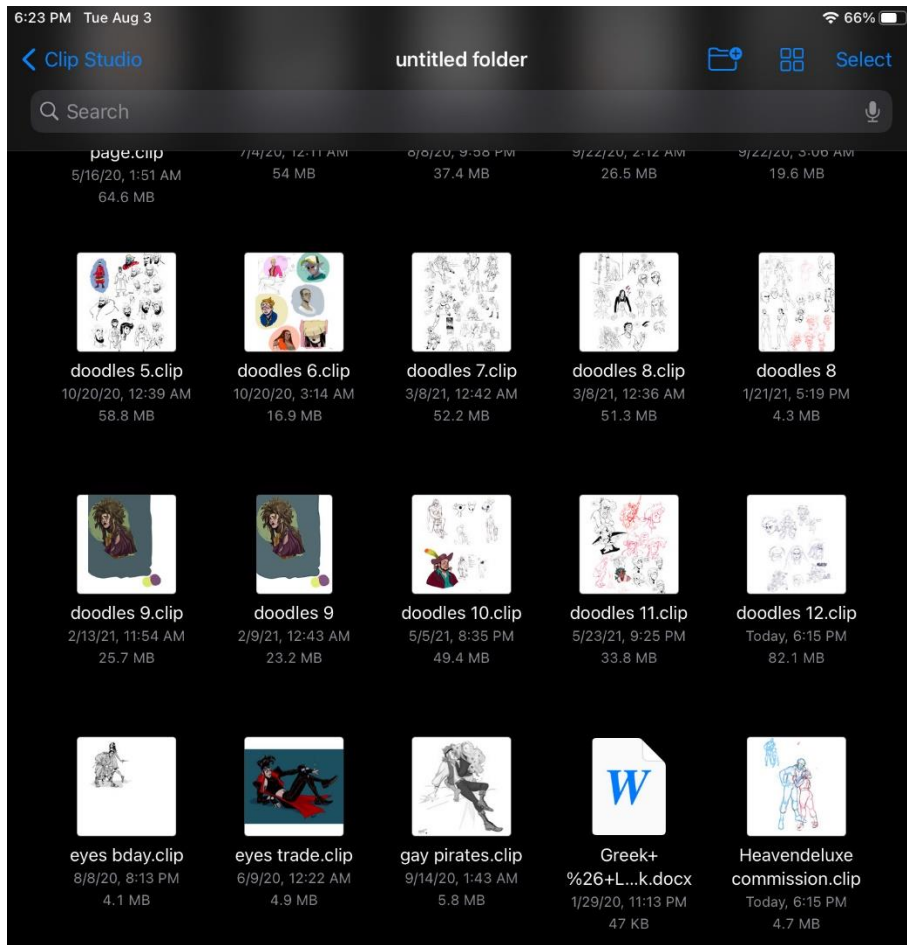
but differentiated by the .mp4 extension (though the .mp4 extension is not displayed in the CSP gallery, as shown in Fig. 7). CSP requires artists to manually turn on the feature for each artwork; disabling time-lapse before export will automatically delete existing videos. CSP allows more control over the exported video, enabling artists to specify the size, length, and aspect ratio of the recording, which is ideal for adhering to the constraints of different social media platforms.

Figure 7: Screenshot of artist Mischa Blevins' CSP gallery, taken August 3, 2021. Notice that "doodles 9" appears twice; once with the .clip extension, which is the working file, and once without, which is the time-lapse video recording. The video recording is automatically saved in .mp4 format.
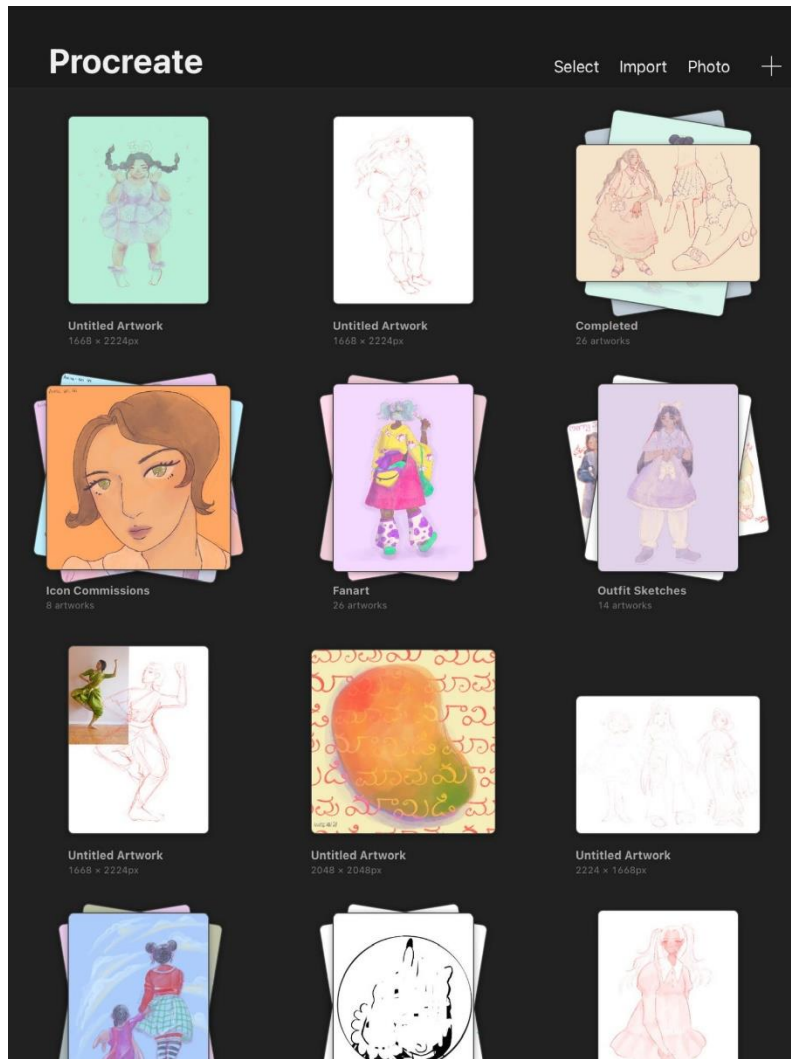
Additionally, Procreate and CSP offer several features beyond time-lapse that can affect the makeup of, and information recorded in, a file. Procreate implemented an autosave feature that stores all files in the app and requires files to be manually exported to save to a device or the iCloud. Deleting the app will delete all saved artworks and files. Within Procreate, artists can drag and drop files to create "stacks" of related files (Fig. 8), essentially performing the equivalent of placing files in folders on a computer. However, this feature is only visible within Procreate, and is not replicated on the local device. Artists can name either their stacks or individual files, but this is not mandatory. Procreate does not automatically assign a numeral suffix to avoid file naming redundancy—it is possible for an artist to have 50 files with the name "untitled canvas." The intuitive and gestural way that Procreate allows artists to arrange their files is another useful tool for studying their working methods, though this could pose problems for archivists hoping that file names will consistently provide a unique identifier. Unlike Procreate, CSP requires users to manually

Figure 8: Screenshot of artist Avina-Kei's Procreate gallery, taken June 1, 2021. The gallery's user interface displays previews of each file, while stacks are signified by multiple thumbnail previews layered on top of each other. The artist has used stacks strategically to organize their work by project, as in the case of the "Icon Commissions" stack in the far left of the second row.

save their files directly to the device, utilizing the operating system's built-in file system. CSP also offers a cloud storage service that enables users to access their working files from any device that has the program installed, meaning that an artist could sketch an idea on their iPad while commuting on the train, and continue working on the piece on their computer at home.

Compared to Photoshop and CSP, Procreate is known for its relatively intuitive, simple, touch-based user interface and lower learning curve. Part of Procreate's simplicity stems from the fact that the program was originally designed to be used with touch controls on the iPad, while Photoshop and CSP began as computer programs that were later ported for tablet use. However, as the cheapest of the three highlighted drawing programs, Procreate does not feature some of the more robust tools that Photoshop and CSP possess, such as AI (artificial intelligence)-powered editing or 3D modeling support.

Both Photoshop and CSP incorporate several features that augment the drawing process, and the use of these features becomes evident when dissecting an artist's working file. To help with perspective drawing, a 3D modeling feature allows three-dimensional drawings to be created or used on a dedicated layer within the piece, either generated by the user or an AI tool. A user can draw in three dimensions and view that model from multiple perspectives, drawing linework over top of it on another layer, while an AI can generate 3D-modeled poses from a photo or extract lines to create a model of a room or environment to speed up drawing. Adobe Photoshop has a "neural filter," which provides AI-powered image editing. These features leave a physical manifestation in the final working file as a record of how a piece was made.

Of all Procreate and CSP's respective innovations mentioned here, the most promising is the development of time-lapse recording. The ability to capture time-lapse video, packaged neatly within the same file as the finished piece or as a duplicate of the original file differentiated by the .mp4 extension, presents an exciting preservation opportunity for archivists. The future archival value of this information is demonstrated by its current popularity and practical usage as a learning tool.

How Artists Use Social Media, Crowdsourcing Patrons, and the Popularity of Timelapse Video

Twitter, Instagram, and TikTok are major platforms for contemporary digital artists, who use them as an interactive portfolio to directly engage with their audience and advertise their services to get freelance work.[25] The real-world impact of social media on an artist's career is demonstrated by Domee Shi, who "won an Oscar [in 2019] for her short film Bao (2018), [and] recently credited DeviantArt for helping her find like-minded creatives."[26] While artists and the public alike may have valid critiques of social media, these platforms can facilitate greater exposure for smaller artists, enabling them to reach larger audiences. Unlike the dedicated art website DeviantArt, the more "general" social media sites allow artists to build bigger fan bases by reaching users who may only be casually interested in art. Users can "follow" multiple artists, and see art woven into their feeds every day alongside memes, photos of family, and so on.

Some of the most popular content shared on social media are time-lapse videos of artists' working processes, either as long-form video accompanied by a voice-over that describes the techniques the artist is using, or as short-form, heavily edited clips with transitions synced to music. Effectively, such videos turn visual art into performance art. Time-lapse videos are posted publicly on Instagram, Twitter, TikTok, and YouTube, with many such videos averaging tens of thousands of views.

Alternatively, some artists post process videos or video tutorials privately for supporters on their Patreon or Ko-fi, which are platforms that allow people to become monthly supporting "patrons" of artists through small payments, usually between $2 and $30. These platforms adapt the historic artist-patron relationship into a more democratic, crowdsourced endeavor. By paying to support the artist, patrons may get the opportunity to view behind-the-scenes content like WIPs, tutorials, or access to the artist's working files. Behind-the-scenes content provides insight into an artist's techniques, which appeals to patrons who may be artists themselves and want to learn how to incorporate those methods into their own work. For many aspiring artists, paying $10 a month to directly support and learn from your favorite artist is much more accessible than paying for four

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[25] Jacob Kastrenakes, "Artists are Irked by Twitter's Change to Retweets," *The Verge*, October 21, 2020, accessed January 5, 2021, https://www.theverge.com/2020/10/21/21527101/twitter-retweet-changes-artists-quote-retweet-qrt.
[26] Kelsey Ables, "The Rise and Fall of Internet Art Communities," *Artsy,* April 19, 2019, accessed January 5, 2021, https://www.artsy.net/article/artsy-editorial-rise-fall-internet-art-communities.

years of art school. Many professional artists are aware of this and have included more educational content on their Patreon as an incentive to attract patrons.
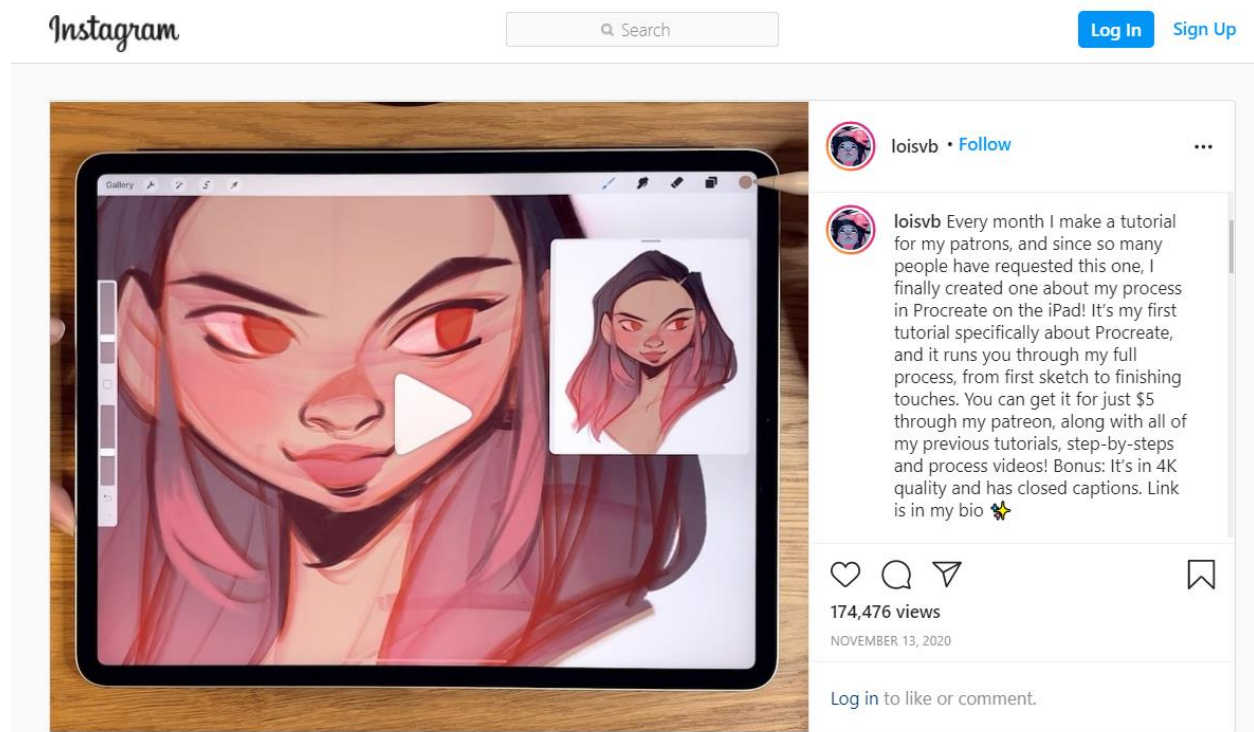

Figure 9. Screenshot of loisvb's time-lapse video clip post on Instagram from November 13, 2020.

One artist who shares videos of their work on Patreon is Lois van Baarle (also known as loisvb or loish). This brief clip (Fig. 9) of van Baarle sketching a portrait has over 170,000 views on Instagram and directs followers to her Patreon account for "tutorials, step-by-steps and process videos! Bonus: it's in 4k quality and has closed captions."[27] As of the writing this article, Lois van Baarle has over 4,500 patrons who support her work, meaning there are 4,500 people who pay monthly to support the artist and to be able to see her process videos. The popularity of these videos and viewers' willingness to pay to see them clearly demonstrates that there is a marked interest in being able to see and study an artist's working methods.

Luis D. Rivero Moreno suggests that the value of a digital work is imparted by the public's participation, as audience engagement, reinterpretation, and resharing reflect a collective agreement that a work is meaningful or impactful.[28] That is to say, a work that resonates with more people is something that is considered valuable; that which is valuable should be preserved. Digital art shared on social media can, at times, be more accessible than physical art kept in a museum, and has the capacity to be shared and experienced by more people. The popularity of a work on social media can be used to infer its cultural impact and the necessity that it should be saved.

Because of the volume of content created online every day, traditional acquisition strategies will be insufficient to fully document the scope of the contemporary digital art world. Instead,

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[27] Lois van Baarle (@loisvb), "Every month I make a tutorial for my patrons…," Instagram, video clip, November 13, 2020, accessed December 29, 2020, https://www.instagram.com/p/CHie-XtAXy-/.
[28] Luis D. Rivero Moreno, "Museums and digital era: preserving art through databases," *Collection and Curation* 38, no. 4, (2019), 90, 92.

Conor McGarrigle suggests that archivists go "beyond the master works paradigm by adopting an economy of plenty through capturing a larger section of the ecosystem."[29] Both Moreno and McGarrigle push for a democratized and more inclusive approach to collection development. Time-lapse may be a popular genre of post, but we should collect many extant examples to accurately capture their cultural significance.

Limitations and Archival Preservation Concerns

Acknowledging current popular demand for access to artist working files, what must archivists be aware of in order to best preserve and provide access to this type of material in anticipation of future need? The following section proposes watch spots regarding external assets, backwards compatibility and file reformatting, access, and color profiles, although unfortunately not all of the issues specific to these programs have clear solutions at this time.

With digital artworks, the archivist must be aware that preservation is "never about the management of a single digital file, but rather a set of relations and interdependencies among a diverse group of component parts."[30] Such is the case with digital comic panels that feature custom typefaces, or any artwork using downloadable assets. Downloadable brush, filter, and font packs became popular in the mid-2000s to supplement the default tools provided by Photoshop, though many drawing programs today have now adopted this feature. Whereas text are the words, font data defines the shape of the text. Without the font data, a computer cannot render the text in that shape and will default to another font that is already installed in the system. The font is rendered via rasterization, converting code into glyphs based on available data from the text or font table stored in the computer. Custom-made fonts used in artworks will only render correctly if the person accessing the artwork also has the font installed. Through services such as Calligraphr, people have the option to create their own fonts, as in the case of artist Ronnie Blevins (see Fig. 10 for Blevins' font sheet made in Calligraphr). Fig. 11 and 12 demonstrate what happens when the font is opened in a different instance of Procreate that does not have that font pack installed.

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[29] Conor McGarrigle, "Preserving Born Digital Art: Lessons from Artists' Practice," *New Review of Information Networking*, (2015), 173.

[30] Colin Post, "Preservation practices of new media artists: Challenges, strategies, and attitudes in the personal management of artworks," *Journal of Documentation* 73, no. 4 (2017), 718.

Figure 10: Font sheet made by artist Ronnie Blevins using Calligraphr.com, sent on August 9, 2021. The grid has "slots" for common symbols, numerals, and letters, and allows users to draw any shape and have it mapped to that key. For example, the artist drew a smiley face in the "%" slot, so whenever that button is pressed, a smiley face appears. Artists often make their own font sheets so that they can type in their own handwriting.

Figure 11: Screenshot of a drawing in Procreate using the font created by Ronnie Blevins in Calligraphr, August 9, 2021.
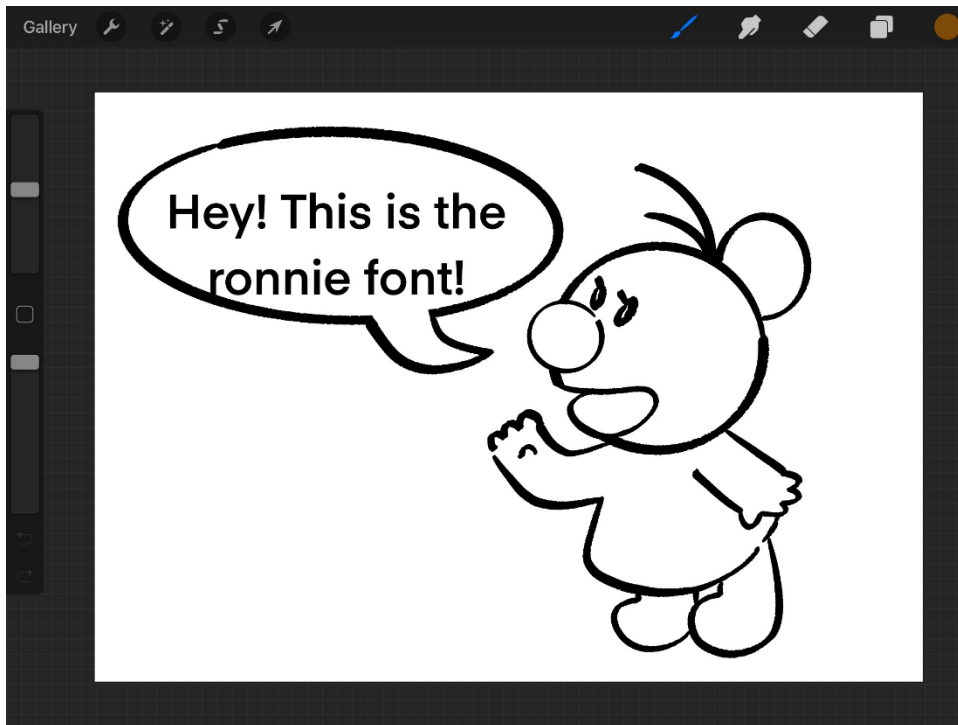

Figure 12: Screenshot of Ronnie Blevins' drawing imported into another instance of Procreate on a different iPad that did not have the font pack installed. Though it is the same image, the correct font could not load because the data that informs the shape of the font is not present; the text is also out of alignment with the speech bubble. Instead, the iPad uses a default font already installed on the device.

With regard to backwards compatibility, both Procreate and CSP assure their users that files created in older versions of the program can still be opened and used in the latest versions. However, this can change the file extension and negatively impact authenticity in the case of CSP. With the release of version 1.5.4 in 2016, the native file format for CSP changed from .lip to .clip,

which was meant to make files "load and save more quickly."[31] While newer versions of CSP can open .lip files, they will be automatically converted to .clip files and can no longer be opened in earlier versions of the program. The artist Steenz demonstrated this process with a piece created in Manga Studio (an earlier version of CSP, which used .lip) and confirmed that all of the content in the piece rendered correctly, including layer information, after the conversion from .lip to .clip.[32] In this process, though, contextual metadata, such as the date of creation and, of course, the legacy file format extension, may be rewritten. Adobe Photoshop and Procreate have both used the same file extension since their release, and therefore do not present the same metadata concerns posed by CSP's .lip.

Relating to access, .procreate and .clip files cannot be read by other drawing programs or viewers, and can only be opened in their respective applications. However, the files can be exported either in their native format or as .jpg, .png, .tiff, .gif, or .psd. Time-lapse videos can be exported separately as an .mpeg4 file. Certain features of an artwork can be lost if opened in the wrong version of a program, as well. There are multiple versions of CSP sold at different price points, including: Debut,[33] Pro, and Ex, which have slightly different functionalities. A multiple page comic or zine created in CSP Ex may not be fully accessible in CSP Debut or Pro, because multiple page creation in a single file is only supported in EX. Similarly, lines or tones rendered from a 3D model and vector layers—features that CSP Debut does not support—could be lost if opened in Debut.

Artist Wendy Xu was one of many to note Procreate's lack of CMYK color profile support as a potential concern for artists who publish their work in print. "[Procreate] can't seem to port a CMYK file properly… so everything I do right now has to be converted. When I port my work into Photoshop as a .psd it looks so muddy… When preparing to publish, I have to send [my work] in RGB to get converted [to CMYK, and] do a palette test with my art director."[34] Altering the color profile or method of display can negatively impact the authenticity of a piece. CMYK is the preferred color profile for printed media, whereas RGB is preferred for sharing work online. If a work is converted from one color profile to another, the colors and overall look of a piece may change. It should also be noted that color and brightness settings vary from screen to screen or even program to program. During the acquisition process, archivists should work with artists directly to confirm that we are preserving the work as the artist intended it to look.[35]

Conclusion and Call to Action: Answering Public Demand for Access to Digital Working Files in Their Native Format

Art has become vastly more accessible to the public through social media platforms, where there is no need to travel or pay an entrance fee, and a single piece can be viewed and reshared thousands of times. Just as artists in the past learned from the old masters, younger generations of artists have grown up immersed in the work of the "digital masters" on social media, and often learn from and seek to emulate those artists' techniques. But artists are not the only ones who are interested in the techniques behind digital works—there are multiple courses and graduate programs

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[31] Emmy Ray, "Now You Can Animate with CLIP STUDIO PAINT 1.5.4!" Smith Micro Graphics Software Blog, March 17, 2016, accessed via the wayback machine August 3, 2021, https://web.archive.org/web/20160723211432/https://blog.smithmicro.com/now-animate-with-clip-studio-paint.

[32] Steenz (second nationally syndicated Black nonbinary cartoonist), in conversation with the author, January 21, 2021.

[33] CSP Debut is a basic version of CSP sold in special offers or bundled with other software; it is not sold as standalone software.

[34] Wendy Xu (illustrator and comics artist), in conversation with the author, February 2, 2021.

[35] Raphael Lozano Hemmer, "#Best Practices for Conservation of Media Art from an Artist's Perspective," in *Digital Art Through the Looking Glass: New strategies for archiving, collecting, and preserving in the digital humanities*, (2019), 112.

dedicated to digital art history throughout the United States,[36] representing real, present demand for the ability to study digital artwork.

Archives of visual material already work to support classes of art students and researchers alike by pulling traditional art pieces for study. By providing access to digital artwork, we can enhance our services to support research and learning in the digital realm. With traditional art, researchers are limited to viewing sketches, proofs, and unfinished works—but digital art provides new opportunities to study artists' working methods at a level of depth not previously available. This includes the ability to see the working layers and sketches that underlie a finished piece, and in some instances, time-lapse videos and WIPs.

The popularity of WIPs and their use as incentives by artists to gain funding through Patreon reflect common interest in the techniques of contemporary artists beyond just seeing the finished piece. With this demand in mind, archivists should consider collecting auxiliary components such as progress posts and time-lapse videos, which are often posted separately. This process becomes much easier when a finished piece, its layers, and video time-lapse recording are all neatly packaged within the same native file format or saved as a nearly identical duplicate of the original file, which Procreate and CSP provide.

Despite their growing popularity amongst artists, Procreate and CSP are not widely known in the archival world, as evidenced by their lack of inclusion in the National Archives of the UK's online registry of technical information on file formats, PRONOM, and their absence in the Library of Congress Recommended Formats Statement. The difficulty of sourcing obscure proprietary graphics software decades later in order to read legacy files is an experience that many digital preservationists are probably familiar with. To prevent ourselves and our future colleagues from having to do that work, archivists today should proactively explore acquiring copies of this software in order to provide access to digital artworks in the future.

Additional avenues of research may involve investigation of informal, community-based preservation projects for niche art and meme communities, such as FlipNoteHatena and TegakiE; the reintroduction of dedicated art sharing platforms such as Bubblehouse, Artfo, Pillowfort, and Art Station in response to Twitter and Instagram, and in comparison to older art community websites like DeviantArt; and a review of data gleaned from interviews with freelance artists about social media image formatting constraints and how those have impacted the literal shape of digital artwork being created today.

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[36] Highlighting a few examples of available graduate studies programs related to digital artwork: Duke University's Trinity College offers a Master of Arts in Digital Art History; the University of Chicago offers a Master of Arts in Digital Studies of Language, Culture, and History; The Pratt Institute offers a Master of Science in Museums and Digital Culture; Cornell University offers a PhD program in History of Art, with the possibility of specializing in digital art.

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