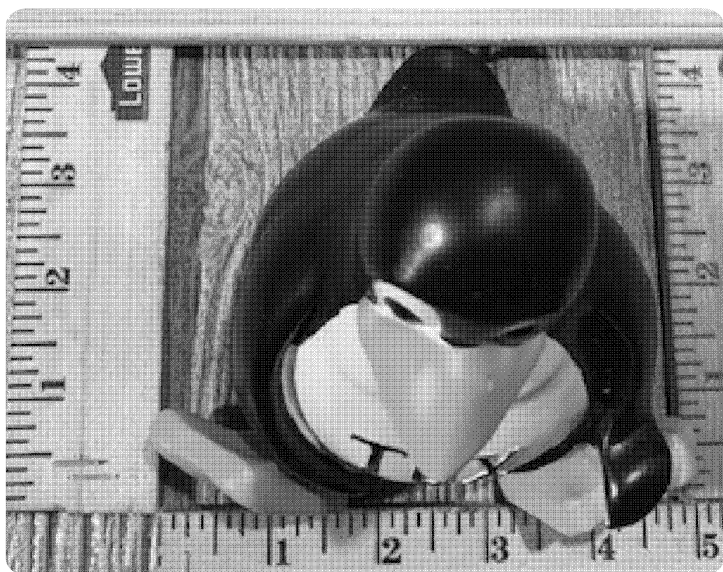


Toolbox Revolution: Democratizing the Graphic Artisanshp



When discussing the democratization of the graphic design field, the conversation could branch into multiple threads. When looking at the word “democratization”, it is often primarily understood as the implementation of a democratic system and principles. Yet the term could be also defined as a way of ensuring accessibility to all participants (66).

While acknowledging the risk of not covering every individual aspect, our present focus will be on the latter – aiming to assess how open tools, resources, and practices can contribute to democratizing graphic design, thereby enabling equal participation in visual communication for all. This involves exploring their potential of solving the realistic and logistical struggles that marginalized and underprivileged groups might face, while also countering provisional stakeholders, which we both listed earlier.

Although it may not entirely resolve issues related to inclusivity, the construct of corporate monopolies, and especially the prevalent harsh working conditions within the creative field; transparency of knowledge and access to tools may play a crucial role in alleviating barriers to engagement in the art and design sphere. Its conceivable influence over technological accessibility, potentially enables individuals to pursue a creative profession fully independently, regardless of background. The essence of this analysis will center on the effectiveness of meeting these factors, along with rating their ease of use and subsequently evaluating their worthiness as alternative solutions for a diverse range of graphic designers.

On Open Source Design Software

Open source tools involved in aiding the graphic design process can span from raster graphics editors such as Gimp (67), Krita (68), and MyPaint (69); vector graphics editors like Inkscape (70) and Graphite (71); 3D modeling tools such as Blender (72) and FreeCAD (73) (however with FreeCAD being preferably used for more haptic and engineered product design purposes and with Blender also capable of functioning as an comprehensive keyframe animation tool); applications for GUI prototyping like Pencil (74); general web-coding editors such as Visual Studio Code (75); and even extending to type design software such as FontForge (76). These applications may offer cost-effective, transparent, and vendor-independent alternatives to exclusionary and expensive industry standards, which could prove to be particularly beneficial for individuals with limited resources and technology in general. On top of that, they are often linked to open and empowering online communities, supporting ecosystems, and additionally providing encouraging assistance through advisory forums and tutorials, software patches, as well as more specific and effective plugins and/or add-ons. Through enabling this toolbox for individuals to acquire valuable skills without the need for expensive design programs, it facilitates further learning experiences and also ongoing software improvement, incorporating enhanced adjustments to fulfill an even broader range of tasks and empowering. Moreover, open source software typically remains cross-platform compatible, often avoiding specific operating system requirements, and can be technically obtained through download from any location with an internet connection. Diverse contributors actively participate in the produc-

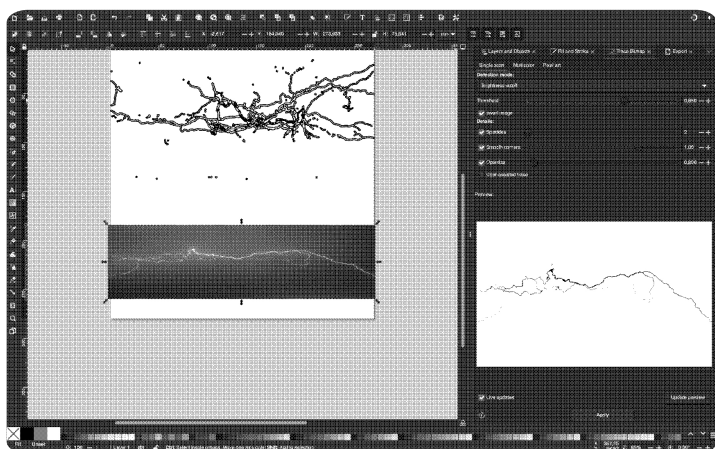
tion and refinement processes. This collaborative effort results in software subjected to rigorous testing, discussion, and scrutiny. The primary emphasis is on objectively achieving the intended task the application is supposed to fulfill, completely freed from the influence of undisclosed corporate interests or sales strategies.

Based on software reviews by users, some open source software are regarded to be the leading applications within their respective fields: For instance, in comparison to proprietary 3D software such as Cinema 4D (77) or Autodesk Maya (78), the program Blender for one proves to be significantly more cost-effective, but also often seems to provide even more versatile and multifaceted capabilities. And as previously mentioned, Blender has even expanded its functionality into 2D animation and video editing (79). Also, since its emergence, the coding editor Visual Studio Code (though a Microsoft product, but made available in open source format), has swiftly become the web designer's tool of choice, offering fast performance and huge extensibility, with aiding coding features and direct download feature for additional extensions; further simplifying the coding workflow. And even considering the more traditional aspects of Graphic design, some tools such as Inkscape can serve as a worthy alternatives to Adobe Illustrator in creating basic vector graphics, especially for beginners. In addition to frequently showcasing comparable, and sometimes even superior, versatility, it is also plausible to dispute that open source tools in graphic design could introduce a distinctive visual approach and style, given their inherently different and flexible approaches to designing. This stands in contrast to conventional design software originating from the same umbrella brand (Adobe), which may tend to generate rather consistent, clean visual output; However, I found that establishing a concrete mea-

surement for this hypothesis on aesthetic outcomes remains challenging to undeniably prove as of now. Besides, it's essential to acknowledge that not all open source programs are able to achieve these same levels of versatility and ease of use. Some open source software frequently face criticism (80) for perceived shortcomings, such as unintuitive and unstructured design, steep learning curves, but also often overall lower performance, increased susceptibility to crashes without integrated data recovery features, and, despite those few exceptions, limited capabilities and feature sets across various applications. As an example, even in regards to Inkscape, the software often proves to be unideal for CMYK conversions for printed objects, as its strengths lie in on-screen graphics, which could rule out a large majority of print illustrators and graphic designers. Additionally, Inkscape falls short in comparison to Adobe Illustrator regarding additional features, plugins, exports, and integrations (81). Similarly, Gimp, while positioning itself as a potential Photoshop alternative, is lacking behind (82) regarding specific editing features, and it also faces challenges in handling diverse and especially larger files. Despite the collaborative and optimization-driven ethos of their communities, some of these open source applications continue to grapple with considerably lower update frequencies, primarily due to their comparatively smaller budgets, forcing open source developers too often to "play catch up" (83) to commercial software features.

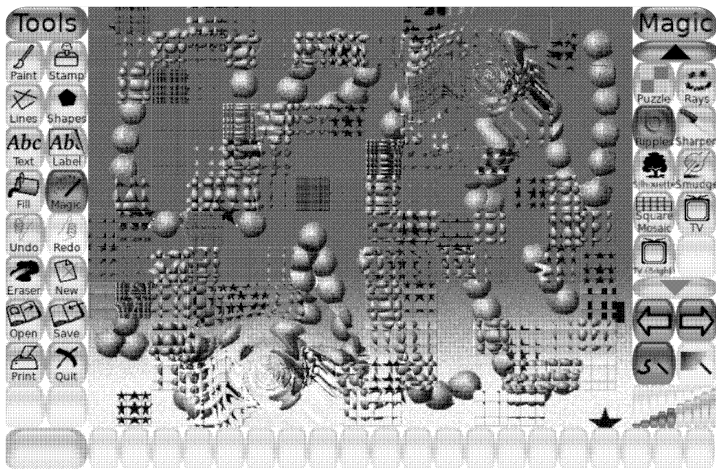
Given that these issues are especially prominent in open source design software, they present serious obstacles for professionals, when considering emigration to these tools. The transition of their workstyle may become challenging due to the absence of extensive capabilities and integrations, potentially hindering the fulfillment of specific requirements

and therefore possibly causing detrimental interruptions in workflow. Despite its huge cost barrier, Adobe products still generally provide more intuitive interfaces with regular updates, new features, as well as performance improvements, with a comprehensive and interoperable suite of applications and services for graphic designers. This contributes to an analogously more efficient and faster workflow; critical aspects for professional creatives that often may be working under very extreme time schedules.

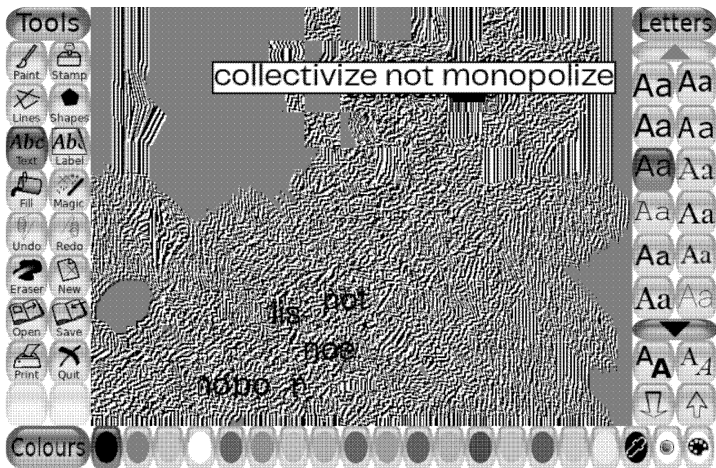


(Own Material)

GUI of Inkscape, while using image tracing



Click to make ripples appear over your picture.



Choose a style of text. Click on your drawing and you can start typing. Press [Enter] or [Tab] to complete the text.



(Own Material)

Abstract sketches, including alterations of type and texture, done in Tux Paint, the open source equivalent to Microsoft Paint

On Creative Coding and Html2Print

Coding forms a foundational base for crafting graphic visualizations in diverse media formats, representing an inherently pure approach that operates freely from specific software dependencies, relying solely on basic text editors. Recognized as a fundamental concept coined “creative coding”, it is situated within a dynamic process that involves visual exploration, iteration, and discovery. In this methodology, code serves as the primary tool for creating a wide array of media artifacts. One might argue that this perspective possibly positions creative coding as an extreme stance, pushing the limits of creative freedom, expression, and overall conceptual patterns, as it ensures a notable degree of both technical and creative freedom. Engaging in creative coding entails active interaction with computers, gaining control over the process, and revealing connections between human thought processes and machine logic. The resulting outcomes may vary based on the chosen programming language, manifesting in diverse applications from web development and interactive experiences to dynamic imagery and motion graphics, to even print formats (84).

They can encompass a variety of common programming languages, including Java (85) for highly diverse contexts, JavaScript (86) within browser-based environments, C++ (87) and lastly Python (88). Often these languages are heavily complemented by open source libraries, frameworks and toolkits such as Processing (89) – a programming language primarily associated with Java and specifically designed for visual arts and creative coding. This ensures accessibility for individuals interested in art and design processes, even if they may not be as technologically adept. Similarly,

p5.js (90) – a community offering vast and useful open libraries, as well as a web editor for JavaScript – enables simple creative coding directly within the browser. Additionally free C++ toolkits like OpenFrameworks (91) or C++ libraries such as Cinder (92) are largely used for installations and multimedia projects, emphasizing real-time graphics and interactive applications.

In the specific context of graphic design for print formats, particularly concerning layout capabilities – though technically being an aspect achievable through all coding languages –, HTML/CSS-to-print strategies have emerged as valuable solutions for handling larger-scale print objects (93).

Despite its origin as a standard markup language for web pages, the inclusion of the media query `@media print{}` within the CSS styling code allows for the application of styles when printing a web page. Media queries, in general, enable the application of styles based on various characteristics of the user's device or presentation medium. Therefore, when printing a webpage from a browser, the browser interprets the styles defined within `@media print` and applies them to the printed document, allowing the creation of styles specifically tailored for print. Within the `@page{}` rule, specifications for paper size and format, margins, page counters, running headers as well and footnotes can be included.

Importantly, enabled by open render engines like Paged.js (94), visualization and printing in the intended format and across various browsers, are easily achievable. Paged.js, a JavaScript library, facilitates content pagination and styling for print. Its script URL can be called within the head tag of the HTML file, and through download provides an additional “interface.css” for displaying page spreads in the browser – a similar preview to conventional desktop publishing tools.

This library and its function empower the free and direct creation of paginated documents and, beyond these steps, the design and coding process follows the familiar structure of HTML and CSS.

With this, creative coding, as well as code-to-print variations, can serve as effective, versatile, detailed, and nuanced approaches to delivering visual results. As standalone languages, they are free of charge and mostly universally available to all, with a strong emphasis on community collaborations that aim to include all conceivable backgrounds.

“We are a community of, and in solidarity with, people from every gender identity and expression, sexual orientation, race, ethnicity, language, neuro-type, size, ability, class, religion, culture, subculture, political opinion, age, skill level, occupation, and background. We acknowledge that not everyone has the time, financial means, or capacity to actively participate, but we recognize and encourage involvement of all kinds. We facilitate and foster access and empowerment. We are all learners.”
– *p5.js community*

Famous designers already professionally designing through these methods include Julian Hespeneide (95), Tim Rodenbröker (96) and Zach Liebermann (97), actively contributing to their code and design communities through talks, blogs, tutorials, workshops and even entire classes, such as Lieberman’s School for Poetic Computation (98). These figureheads often rely on the aesthetic and pedagogic power inher-

ent in their techniques, claiming that their visual experiments not only enhance visual realization but also contribute to strengthening skills such as computational thinking, pattern recognition, human values and other soft skills in their entirety. Additionally, OSP Kitchen: Open Source Publishing (99), a Belgian design collective, professionally utilizes diverse code-to-print methods and various other open source tools. Their work successfully demonstrates the viability of professional work through this open modus operandi, seeking alternatives to traditional graphic design studio models. Furthermore, the generative and repetitive components of designing through code, can be practical, easily variable, and immensely time-saving (in at least some instances) and particularly viable in fulfilling more repetitive design patterns and systems.

Yet these approaches indicate some potential for enhancement. Despite the assistance and wealth of resources provided by the open source community, coding, while more accessible than ever, still presents challenges with steep learning curves. Essentially, these codes frequently involve intricate amalgamations of sometimes complex functions and syntax, acting as a deterrent for those without technological proficiency, even if only on a surface level. Ultimately with graphic design being a highly visual discipline, creative individuals may find huge disinterest when working with lengthy abstract code instead of physically and actively interfering with the visual result.

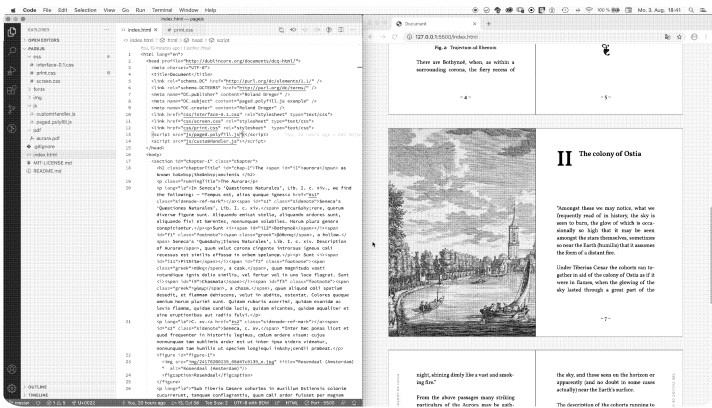
“To use code as a tool for design, ideation, communication, and adjustments is a process that creates a lot of friction. It demands constant switching between the definition space – the code – and the outcome – the resulting appearance and structure. (...) Look at sketching: You can quickly draw what a product or a website may look like. You evaluate what is good or bad about the drawing, think it through, and iteratively make changes. The feedback is instant: if you slip and the crooked line messes up the design you see it right away. If the slip actually adds something good, you see it too.”

– *Open Source Design*

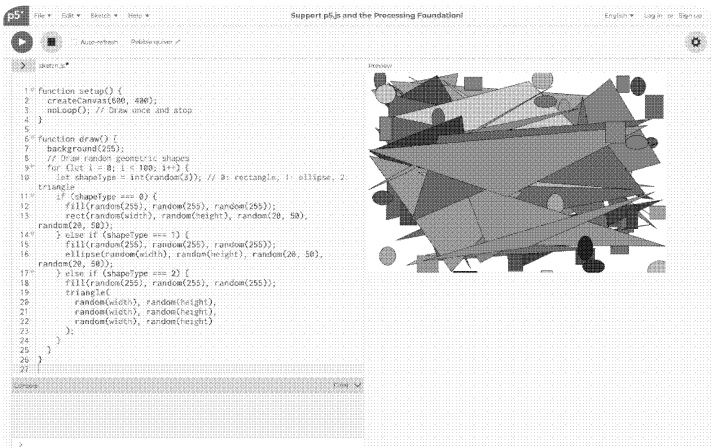
Additionally, when utilizing CSS-to-Print technology, the design process excels in handling categorized repetitive styles but struggles with personalized and spontaneous layout changes. Addressing unique elements beyond usual classifications in HTML/CSS can prove tedious, particularly for larger page files. Typographical adjustments are limited to word- and letter-spacing, and some general kerning and hyphenation specification, for larger text constructs. However, no flexible provisions for more individual spacing and kerning abilities are possible with HTML/CSS.

With the exception being Lettering.js (100), a free jQuery plugin, built for the sole purpose of modifying individual text elements. When incorporated into an HTML file, Lettering.js allows for the dissection of text into single elements (spans), enabling detailed control for traditional CSS text style adjustments like color, size, rotation, or spacing. Mainly well suited for a manageable selection headlines in

smaller projects, it becomes ridiculously laborious in larger files, where specifying the style for each letter adds even more complexity and length to the code, resulting in unhandy and impractically massive lines of code, but also notable decline in performance. Generally speaking, CSS-to-Print design already heavily relies on browser capabilities, leading to significant variations in print file outcomes and overall style, as well as performance, across different browsers.



(Dreger, Roland: Paged.js Example)
 Example of a HTML-CSS-2-Print
 Workflow, done with Paged.js



(Own Material)
 Example of a case written in p5.js.:
 With this code random shapes at random
 positions, appearing in random shades and
 sizes (all withing a set up canvas), are
 created upon reload

On Open Resource (1)

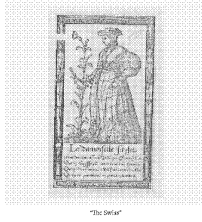
When looking at licensing agreements, such as the Creative Commons and public domain, as well as various other royalty-free media license and typeface agreements, a multitude of distributive entities are able to operate through the the World Wide Web. Often even unsalaried, these individuals consent to share their design resources, assets, and typefaces freely and openly with others. They thereby are able to facilitate a profoundly broader and more diverse group of individuals to freely use and modify materials for creative expression. Importantly, this freedom comes without the looming concern of large legal repercussions, or any other hefty barriers, simply for their graphic reappropriation.

Some stakeholders in open and free visual content include Wikimedia Commons (101), Openverse (102), and Flickr Commons (103). These platforms frequently offer variations of Creative Commons agreements, mainly run voluntarily and financed through donations. Other libraries, like Unsplash (104), Pexels (105), or Freepik (106), operate under their own distinct royalty-free licenses and are characterized as more commercial variants. Nevertheless, they still provide free access to a wide range of graphical assets beyond just imagery. This includes illustrations, mockups, icons, and even videos, with all of these platforms sharing the commonality of primarily offering user-to-user generated content. Regarding the concept of the public domain as the utmost assurance of unrestricted reutilization, public domain content can be discovered, in part, on platforms like Wikimedia Commons. Additionally, substantial collections are commonly housed in large, often publicly funded media libraries and archives, including the Internet Archive (107), Smithsonian Open Access (108),

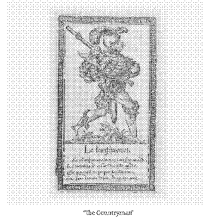
The Public Domain Review (109), and Getty: Getty Open Content Program (110). Their intended benefits focus on enhancing accessibility to cultural artifacts, supporting education, and culture, as well as the arts, by contributing to the preservation and wider democratic distribution of media resources. However, while having the potential to offer distinct visualities, these repositories sometimes present imagery of relatively limited quality as well as quantity. This can be especially notable in the context of public domain content, where general rules, such as extending copyright for an additional 70 years after the departure of the copyright holders (111), may result in a more restricted availability of material. Moreover, in regards to more commercial variants of free image libraries, Unsplash altered its licensing to their proprietary royalty-free version in 2017, moving away from Creative Commons licensing. This change led to compatibility issues with GPL and introduced a lack of clarity in the license, raising uncertainties about the future public domain status of roughly 200,000 images. Unsplash co-founder Luke Chesser justified the license change, stating that it was intended to safeguard contributors from misuse (112), such as images being downloaded and resold on other platforms. This decision has sparked persistent concerns about the possibility of Unsplash making additional, rather commercially oriented, changes to its terms and licensing in the future



"Le colosse"



"Le Sefar"



"Le Courrouchal"



(The Public Domain Review: François Desprez's Collection of Various Clothing Styles)
The Public Domain Review collection of renaissance woodcuts by François Desprez

Wikimedia Commons search results for "President". The page displays a grid of 127,835 image results. The search interface includes a search bar, filters for image size and orientation, and a sidebar with navigation options like "All media", "Image gallery", and "Image gallery".

(Wikimedia Commons: "President" Search)
Public domain collection within Wikimedia Commons; these materials frequently encompass resources released by government entities

Furthermore, claims have emerged, asserting that some of the free footage was occasionally uploaded without attribution to the rightful author (113) or faces included without obtaining proper legal consent, as would likely have been the case with paid stock image libraries featuring professional photographers (114). Also, though the democratization of some visual design aspects may be encouraged through completely free stock libraries, critics argue photographers and graphic artists contributing their assets on these sites for free could significantly impact fellow creatives within the industry (115).

(2)

Libre Type designers, referring to type designers freely distributing their fonts to others, constitute another essential part of alternate open resources for graphic designers. Since their format technically falls into the same category as any other open source software, Libre type designers often attach their work to the same moral and legal groundwork of the open source movement, often running through GPL, such as the SIL Open Font License (116), as well as the Apache License (117), guaranteeing freedoms such as the right “to use and run”, “to study and edit”, “to contribute” and “to share, redistribute, and redistribute modifications” (118). While mainly contributing independently, many of these type designers can also be found on larger Libre type platforms, such as most notably the collective Velvetyne (119), promoting open and transparent type design, but also seeking to refine the OFL licensing system to further democratize typography. Moreover, active participation in more policy-oriented Libre type is characterized by collectives like Typothèque Bye Bye Binary (120) and Badass Libre Fonts by Womxn (121). Also, collections stemming from academic endeavors, such as the

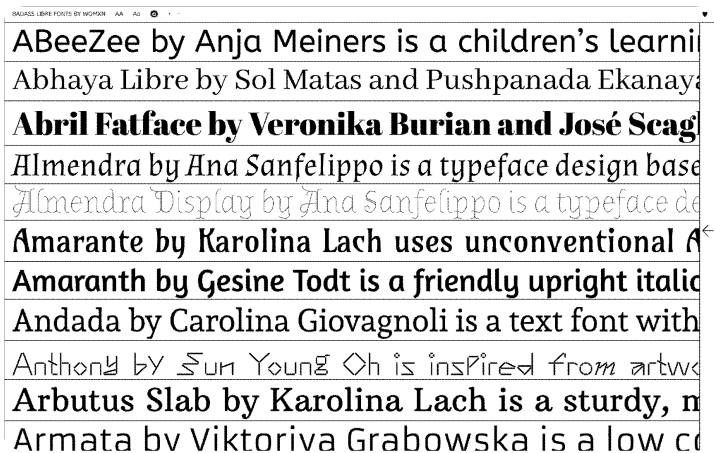
SUVA Type Foundry (122) from the Estonian Academy of Arts, are contributing to the libre type sphere. Furthermore, even the industry heavyweight Google has ensured unrestricted open source usage for their extensive repository of typefaces through the Google Fonts collection (123).

In light of their accessible nature, free fonts and their libraries provide an easy avenue for quickly exploring and experimenting with diverse typefaces, even offering opportunities to modify individual shapes, thus gathering overall typographical experience. This accessibility could again prove to be especially advantageous for individuals and communities with limited financial resources, owing to the non-existent expenses made. It lays foundations for creative freedom, empowering designers and artists from systematically marginalized communities to express themselves more freely with typography. Consequently, this democratization of the typographical process not only establishes a platform for innovation, but also diversity, and encourages cultural exchange – for instance with the unicode font Noto (124), including closely all of the world’s writing systems, even endangered ones –. Of course, Libre Type comes with its own defects, considering they are majoritively novice products. Often created in the context of shorter side projects with time constraints, these typefaces may have been developed hastily, likely leading to shortcomings such as compromised kerning or the absence of multi-language characters (apart from Noto) by their creators (125). Compared to premium typefaces that offer extensive variations of font faces, Libre typefaces often include only one or a limited amount of weights, likely posing challenges when implemented within more comprehensive design systems.



(Rory King: dasickfonts)

Free experimental type designed and published by Rory King



(Design—Research.be: Badass Libre Fonts by Womxn)

Collection of Fonts as presented on Badass Libre Fonts By Womxn

On Open Communities, Hubs and Networks of Knowledge

The often-referenced communities and hubs, engaged in constructing, contributing to, and sustaining various open infrastructures, serve as pivotal catalysts for democratizing technology, digital design, and the overall dissemination of knowledge. Among these, GitHub (126) stands out as a prime example. This web-based platform leverages Git, a free software for storing and archiving various code, content, and knowledge, initially developed by the renowned open source figure Linus Torvalds. GitHub not only promotes collaboration among developers but also actively engages designers, especially those in digital fields, nurturing contributions to open source projects. Github's influence extends beyond coding realms, creating a comprehensive ecosystem where diverse individuals converge to advance shared knowledge and innovation, with a strong emphasis on amplifying marginalized voices (127).

Equally central to technological evolution is the significance of open participation in machine learning. Additionally, the platform HuggingFace (128) provides diverse models and spaces for exploring machine learning concepts, with significant repositories on the creative aspects of open source artificial intelligence. It hosts image and video generators as well as interpretation models, including versions of the free and open AI image generator Stable Diffusion (129); enabling broad spectrums of individuals to actively participate in shaping vital AI advancements inside the creative landscape.

Nonetheless, upon critical analysis, the abundance of information on these platforms might still pose some rather minor down-effects, such as delays for developers in making

their first pull request – a method used to suggest modifications, additions, or fixes to a project. Additionally, these open platforms might be more prone to limitations in the review process, such as potential bias in paper selection, library coverage, and the subjective interpretation of research papers. (López, 2004, pp.38–39.) Even so, platforms like Github, transform from communities of traditional (mainly narrowly fixated) developers to rather “social developers”. (Singer, 2013, pp. 103–11.) This becomes apparent through its incorporation of social community components and strong cordial exchange based on matching interests, allowing for more selective contributions and social connections; but also welcoming the integration of initially unaffiliated newcomers into the core team. Github also features even more specialized contributions to the open source graphic design and digital art realms, such as initiatives like Open Source Design (130). Individuals behind Open Source Design aim to further stimulate an open design process by engaging existing open source projects like Mozilla and Canonical, aggregating design blogs, and creating a supportive community for designers. By hosting Git workshops, providing collaboration resources, and organizing events, their target is set on making designers active contributors to open source projects. Improved communication channels between designers and developers, including an open job board and guidelines for presenting designs, attempts to facilitate collaboration. Additionally, the initiative seeks to connect the open source design community by participating in conferences and securing funding from foundations and agencies, while showcasing existing open source design materials and contributing to the improvement of open source projects through UX reviews and mockups.