Chapter 5
Implementation: Hardware, Software, and Applications

Abstract A wide variety of hardware, software, and applications is available to support art, design, and collaboration. The issue of Mac versus Windows PC is reviewed for art, graphics, and design applications. Public domain and commercial software are available for 2-D and 3-D painting, design, and animation containing a variety of functions, and these are reviewed. Specialized applications such as 3-D printing and laser scanning are summarized.

Keywords Commercial software · Public domain software · Painting software · 2-D drafting · 3-D design · 3-D animation · Laser scanning · 3-D printing

5.1 Introduction

The majority of hardware and interface technologies need software to drive them. This means that it is primarily the software which interfaces directly with the user. It is important therefore that the software offers a user interface which is clear, easy to use, and unambiguous in order to enable the user to activate the functions in the hardware that they require with the minimum of effort. This enables the user to concentrate on the task they wish to accomplish and ensure that the hardware/software combination acts as servant to their creative objectives. This is ideal, of course, and many hardware/software interfaces fall short of this ideal in various ways. It is important therefore that the user exercises caution and rigor when selecting software for their application. Post-wimp interfaces including virtual reality are discussed in Chap. 3 on Technology.

5.2 Mac Versus PC

Historically, graphics designers favored the mackintosh because of its more powerful processors and its graphics community [1]. However, the internal components are now very similar for both Mac and PC. In addition, the application interface to

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the user for most programs is now the same, so in theory it makes little difference whether the underlying platform is Windows PC or Mac [2, 3]. The latter is normally more expensive than the PC. If more general computing facilities are required in addition to those for art and design (e.g., 3-D modeling), it may be an advantage to use a Windows PC because of the wider variety of more general software that is available.

Reasons to Favor a Mac.

There are some technical reasons why some people should choose a Mac for their design workflow. Here are a few.

- Using Thunderbolt 2 for large file transfers or connecting to 4 K monitors, especially when using laptops
- Integrating a workflow that uses other Apple devices such as the iPad and iPhone.
- You're a Motion Graphic Designer that uses Apple Motion and Final Cut Pro in addition to your Adobe applications.
- Operating System preference for usability and minor features.

Reasons to Favor a Windows PC.

Likewise, here are some important reasons you might opt for a PC.

- Windows computers cost dramatically less for the same performance specifications, particularly in laptops.
- Access to Windows-only productivity and business software.
- System compatibility with your business clients, especially if they are outside the creative services industry (90% Windows users).
- The ability to upgrade and customize hardware to specific needs.
- You're doing high-end animation or video production in addition to design and need to leverage multiple hard drives and graphics cards in your workflow.
- Operating System preference for usability and minor features [4].

5.3 Commercial Software Versus Public Domain Software

Commercial software has vendor support and an upgrade path to new versions. However, it has a cost. This may depend upon the version selected—lowest cost versions may contain the smallest number of functions, while the highest cost version contains the most advanced functions.

Public domain software is free and comes without support (though there may be a community of users who can answer questions). Some vendors may make earlier version of their software available for free download.

5.4 Painting Software

Software is normally available on both Mac and PC. Some vendors will make earlier versions of their software available as a free download. Table 5.1 summarizes a number of applications programs for painting. Prices given are approximate and are likely to change over time as updated software versions become available. Vendors may have a number of different versions of their software available ranging from low-end (at lower cost) to advanced functionality (at higher cost). Users generally select the version which contains the functions they need and best suits their application and its requirements.

5.5 Software for Artists, Designers, and Animators

A number of these applications are designed for the high-end film, animation, and video game sector and therefore have a cost which reflects the power and capability of the software. Prices given are approximate and are likely to change over time as updated software versions become available. Vendors may have a number of different versions of their software available ranging from low-end (at lower cost) to advanced functionality (at higher cost). Users generally select the version which contains the functions they need and best suits their application and its requirements.

Some vendors will make earlier versions of their software available as a free download.

Table 5.2 summarizes a number of applications programs for artists, designers, and animators.

Table 5.1 Painting software

Software	Functions	Application to art and design	Cost/access
Adobe photoshop	Image editing and manipulation	Digital painting and drawing to mimic those done by hand	Lowest cost access is via Creative Cloud at approx. $10 per month
Corel painter	Painting	Natural media brushstrokes	Approx £200
Corel particle shop	Particles	Plug-in for Photoshop to give fluid brushes which depend on pressure and movement	£24
Art rage	Paints and mixing	Chalk, oil paints, watercolors, inking pens	$79
Rebelle	Watercolor	Pastel, pencil, ink pen, marker, and airbrush	$60
Autodesk sketchbook pro	Sketching	Sketching	$25 p.a.

Courtesy of http://www.digitalartsonline.co.uk/features/creative-software/best-painting-software-for-artists-painting-apps-for-mac-pc-as-used-by-professionals/

Table 5.2 Software for artists, designers, and animators

Software	Functions	Application to art and design	Cost/access
Poser pro	3-D character art and animation	3-D animation	$300
Go animate	Online animated videos	Online animated videos	$300–1000 p.a.
Mudbox	3-D animation	Sculpting and texture painting tools	$495
Blender	3-D animation	3-D animation	Free
Flipbook	2-D animation	2-D animation	
Easy paint tool	Painting	Paint brushes	
FL studio	Software music production environment	Compose, arrange, record, edit, mix, and master professional quality music	$89–830
ZBrush	3-D	Sculpting, texturing, rendering	$795
Cinema 4-D	3-D	Modeling, animation shading	From £385
Maya	3-D animation	3-D animation and visual effects	From $36 per month
Harmony	2-D animation	Animation software and storyboard software for animation *studios* and media publishers	$15–73 per month
Adobe illustrator CC	Industry-standard vector graphics app	Logos, icons, sketches, typography, and complex illustrations for print, web, interactive, video, and mobile	$30 per month
Adobe Premiere Pro CC	Video editing	Film, TV, and web	£9–69 per month
Unity pro	Game development	Games and VR/AR	$75–125 per month
Mari	3-D modeling and texturing	3-D texture painting	Approx £1200
Autodesk 3DS max	3-D modeling, animation, and rendering	3-D modeling, animation, and rendering	$185 per month

Courtesy of http://www.animationcareerreview.com/articles/top-20-most-essential-software-artists-and-designers

5.6 Free Software for Computer-Aided Design

Computer-aided design (CAD) uses an application program to perform the design and documentation process. Interaction enables design ideas to be explored before they are finalized. A 3-D design can be displayed as a plan drawing (i.e., suitable for architects and builders to use) or a 3-D rendered version to enable the designer to see how the 3-D structure fits into the real-world environment. Table 5.3 shows some typical free software for CAD.

Table 5.3 Free software for computer-aided design

Software	Functions	Application to CAD	Cost/access
SketchUp make	Creates surfaces from lines and extrudes 3-D solids from surfaces	Library of pre-designed scenes and objects	Free
Sweet home 3-D	3-D design	Library of furnishings and objects	Free
Blender	3-D modeling	Import/export more than 20 file formats, including DXF/DWG	Free
ProgeCAD smart	Similar to AutoCAD	Libraries of over 11,000 blocks and symbols	Free
Sculptris	3-D	Works with .OBJ files, creating shapes and then applying textures	Free
DraftSight basic	3-D	Create, edit, and view DWG files	Free

http://www.techsupportalert.com/best-free-cad-computer-aided-design-programs.htm, http://blog.dreamcss.com/design-tool/free-computer-aided-design-software/, http://www.hongkiat.com/blog/free-cad-software/

5.7 Software for Computer-Aided Design Requiring a License

Prices given are approximate and are likely to change over time as updated software versions become available. Vendors may have a number of different versions of their software available ranging from low-end (at lower cost) to advanced functionality (at higher cost). Users generally select the version which contains the functions they need and best suits their application and its requirements.

Table 5.4 presents a selection of commercial CAD software.

5.8 Software for Graphic Design

The best free graphic design software [5] includes as follows:

- Vector art
- Image editing
- 3-D software
- Data visualization
- Other useful tools.

Table 5.4 Software for CAD requiring a license

Software	Functions	Application to CAD	Cost/access
AutoCAD	Most popular CAD software	Drawing exchange file form, DXF, is an industrial standard	£204 per month, and upward for premium product
Turbo CAD deluxe	2-D/3-D modeling	Draw, modify, dimension, and annotate. Materials, lighting, and photo-realistic rendering	£105
Design CAD 3-D max	2-D/3-D modeling	High-quality designs, simple renders, and animations	£80
SketchUp pro	3-D modeling	Export pages as PDFs, images, and CAD files	£562
TurboCAD LTE pro	2-D/3-D	Full featured 2.5D CAD that works like AutoCAD LT	£242
CADopia	3-D	For engineers, architects, drafters, designers	£359
Form Z	3-D	Advanced 3-D solid and surface modeling	£804
ZWCAD+	3-D	DWG native format, feature rich commands	£646
BricsCAD	2-D/3-D	Drawing and modeling	£392

Courtesy of http://www.toptenreviews.com/software/multimedia/best-cad-software/
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5.9 3-D Printing

3-D printing is an additive process whereby the layers of a 3-D object are built up one after the other. Input is taken from a digital file containing a 3-D representation of the object to be printed [6]. Such objects can be designed on a computer screen and visualized before they are sent to a printer. Schools of Art and Design often have a 3-D printer accessible over the network. If not, central IT services or the Department of Mechanical Engineering in an institution or organization may have access to such a printer.

5.10 Laser Scanning

Laser scanning involves the control of a laser beam to measure distance and capture the shape of a 3-D object, such as a statue, building, or landscape. This process is controlled by software running on a computer, and the scanned object is stored in

digital form. This may then be analyzed or modified using CAD software, or more specialized applications.

The Digital Michelangelo Project [7] at Stanford University performed a detailed scanning and analysis of statues and mosaics and compiled an archive of 3-D models which is made freely available over the Internet [8]. This project illustrated how technology could be utilized in an artistic application.

It is also possible to generate a 3-D model from photographs and images using specialized software [9].

5.11 Collection Management Software and Art Gallery Software

A variety of software is available for management of collections and also for organizing art gallery exhibitions [10].

5.12 Case Studies

This volume includes a number of case studies to illustrate the processes involved in utilizing technology for creative and artistic applications, often in the context of collaboration.

5.12.1 Using Mobile Technology to Facilitate Engagement with the Arts for Children with Autism and Their Families

Dr. Tracy Piper Wright details a project to use mobile technology to increase engagement with the arts for children with autism. The aim of the project was to provide supported and positive experiences to children with autism and also to provide motivation to explore further arts and cultural opportunities. The project was part of the UK Digital R&D Fund for the Arts, whose objective is to increase engagement with the arts through technology.

Four principal issues arose during the work as follows:

- How to produce a design for this application area
- How best to involve the target users in the design process
- How to engage participants from areas that are hard to reach
- How to best manage the discussions between the various fields of expertise in the multi-disciplinary collaboration.

5.12.2 *The Development of New Technology in Creative Music Applications*

The next case study, by Dr. Stuart Cunningham, Steve Nicholls, and Steffan Owens, explores how technology has been instrumental in the development of music, the areas of music generation, music representation, and music recording. The case study focusses on the relationship between musical creativity and technological development.

The interaction of music and technology is investigated in two scenarios:

- the creative processes surrounding music production
- the education of musicians, particularly in the teaching of timekeeping.

It is demonstrated that there has been resistance to fully take on board the possibilities offered by new technologies, in contrast to other areas of the music industry (e.g., digital recordings). Suggestions are made for how this situation might be changed in order to be able to more fully exploit the potential of new technology in this area.

5.12.3 *Visual Arts, Mental Health, and Technology*

The final case study by Dr. Karen Heald and Dr. Susan Liggett investigates the use of the visual arts and new technologies in the field of health and well-being by exploring a number of nationally funded projects in the UK in this area.

Much of the human's emotional experience is pre-verbal or non-verbal and occupies an experiential space that is dream-like and difficult to articulate. This case study investigates the work of several contemporary international artists. Some of the artists use multimedia, and some use technology in distant locations to assist with vulnerable adults and young people.

The use of video and new technologies such as virtual reality has made a significant contribution to the field of arts in health.

The lessons learned from the problems and difficulties encountered by artists collaborating with the medical professions are summarized,

5.13 Conclusions

The increasing sophistication and usability of new technology is making an increasing impact on art, design, and collaboration. It can be seen as a tool which facilitates and augments creativity rather than impedes it. A wide variety of

software is now available for design, animation, and painting. The basic functions an artist or designer may require are often in the low-cost (or free) version, providing opportunities for artists and designers to explore these new capabilities at minimum cost.

Further Reading

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