

HOW TECHNOLOGICAL ADVANCEMENTS HAVE INCREASED EFFICIENCY AND ACCESSIBILITY IN THE GRAPHIC DESIGN INDUSTRY

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Supervisor: Donna Williams

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Introduction

The interest for my topic was due to lack of knowledge on my part about the graphic design industries history. This is partially due to the fact that I am a new designer and only know the world of graphic design through the software and machines that I use on a daily basis. The problem here is that I have lack of respect for how difficult processes and methodology's use to be. The world of graphic design to me is the software I use to produce designs and cannot imagine another way of working in a different manner. The focus here is to research into the background and roots of design and what the software's used today replaced when they came along. With this in mind it will give another outlook on processes that I take for granted today and enable me to respect the work that has gone into making the field this way.

This independent inquiry has two chapters that are organised in two manners. Beginning with chapter one exploring graphic design and where it began which then slowly works its way into a timeframe beginning in the past and working its way to present. With each point in this section will be discussed at its present standpoint and further points of how it compares to future processes will be made when discussing the latter. The second chapter will focus on present techniques and how what techniques they replaced when invented.

At the beginning of chapter one this inquiry will explore into the basic fundamentals of what graphic design is. This will further lead to the follow up question of where graphic

design began according to multiple sources this again will only be explored briefly and has sole purpose of leading to exploration of the history and advancements of print. This is the main focus of the entire chapter and as stated will go according to a time frame. It begins with the exploration of the first written language, the reason of importance of the language is to be able to demonstrate the lack of efficiency and accessibility surrounding it. This chapter will then explore the progressiveness of the process printmaking throughout history and what came with the advancements. The exploration of the most modern techniques will only be briefly explored in comparison to its priors. The main focus of this chapter is to attempt and demonstrate with each advancement explored what benefits came with it in terms of being accessible and efficient.

Thus, leading to the second chapter of this independent inquiry which will begin by exploring briefly into the digital era of technological advancements. The exploration will briefly discuss benefits and counter arguments of some of the advancements made in the digital era of the world. This will further lead into the exploration of how graphic design has been affected by the discoveries made and what it means for the world of design. The inquire attempts to highlight software in this exploration to further go on and discuss the technological software applications that have benefited the industry of graphic design. This section will not be explored in the same manner as the previous chapter but will explore different software applications and what they replaced in the physical design field.

This independent inquiry attempts to demonstrate how these advancements have not only made the field more accessible to the world but how they have advanced to become a more efficient field.

Chapter 1

1.1 What is Graphic Design

Graphic design is the process of creating and producing visuals that solve problems and communicate a message. In the working world a graphic designer will work with a client who has a problem. This can be anything from the client's business needs such as branding, to a charity needing a website the possibilities are endless. The graphic designer's role is to take in their client's ideas, needs and target audience and produce something that optimizes the elements they need best for the user experience of where which said piece is going to be featured (Heller, 2010). Graphic designers work with typography, photography and illustrations and usually produce drafts upon drafts before achieving their outcome. Some argue that graphic design is the more technical side of design in comparison to fields such as fine art and illustration (Heller, 2010). They also work with the printing press but as technology has advanced in the last thirty years this methodology of work is becoming more of a novelty in industry.

1.2 Where did graphic design begin

As graphic design is used so heavily in everyday life, it is unclear to pinpoint where it all began, resulting in a disagreement among people. Arguably nobody is right or wrong. Although the process itself only got labelled in nineteen twenty by William Addison Dwiggins (Meggs, 2016). The actual origin of graphic design dates back much further. Some westerners argue that graphic design only dates back to the fifteenth century (Rees, 2005) as the printing press was invented. The printing press was invented by a

German goldsmith of the name Johannes Gutenberg (Rees, 2005) (Triggs, 2011). Even though this was a significant point in time for graphic design as the press enabled mass production, in which creating more possibilities for the field of design and type. This time and invention was not the beginning of graphic design.

Its apparent that the human species has always had an eye for art and design. As throughout the years researchers and archaeologists have discovered cave paintings that date back to prehistoric times which is clear evidence that people have always had a place for visual communication. Although it is unclear what these cave paintings were trying to communicate, they are almost lost in translation to the twenty first century. Which makes sense as considering how far humans have come in regard to communication and language (Valladas. et al, 2001). The key point here is that visual communication is not a product of modern culture and practices but ancient art that will be a further progressing field that will no doubt get even more advanced with time.

1.3 The history and advancements of print

These cave paintings date back to thirty-eight thousand BCE (before common era), the first documented written language was created thirty thousand years later, with some dating it to eight to three thousand BCE (Sungum, 1924). This language is Sumerian, and the written language was unique in comparison to the way words and languages are written today. Also, although the written language was very symbolic it marks a new era of communication, written communication (Cooper, 1996).

The importance of these milestones is displayed with how well the visual communication has progressed and advanced throughout history. Without these

discoveries it is possible that the fields progression would have been delayed. Each milestone has its place in history that we will further explore.

The next steppingstone for the field now was the ability to move onto printing. As at the time these written pieces of Sumerian language were all carved into tablets, arguably some believe this is still considered printing (Cooper, 1996). Another notable form of printing around this era, are seals, stone and bronze block printing. Seals were commonly used in Asia in the third century BCE. Seals were made and primarily used in china, and as we further explore into prints history, we will see how dominant china was in the beginning stages of print (Diringer, 2013). These techniques lacked efficiency, ease and accessibility.

Now moving forward in the CE (common era) only the tip of the iceberg had been revealed for print and it was all to come. Sparking the next big advancement for print, woodblock printing. Some argue that this is truly the first form of printing (Diringer, 2013). Which has a strong argument as it was indeed the first form of printing to be used in the paper medium (Diringer, 2013). This method of printing was created in China and was primarily used throughout east Asia to print on to textiles. They would begin the process by carving their desired design, whether that being type or a symbol, into a block of wood and applying ink to be distributed on to the textiles (Allen. Et al, 2010). Many people in China believed there was an ancient legend behind the discovery of the wood block printing (Allen. Et al, 2010).

As mentioned earlier the woodblock printing method advanced to being able to have the ability to print on paper. This process was introduced by people practising Buddhism. For a long time, printing was heavily and primarily used for religious purposes, this

comes with no surprise given the timeframe of these inventions and discoveries (Allen. Et al, 2010). As these stages of print progressed so did the production rate, as these processes were much more efficient for mass production. This form of printing was ground-breaking for the field of print and graphic design. Not only did it pave the way for future inventions but changed the field of how things were written. Woodblock printing changed the layout of written design (Allen. Et al, 2010). Up until this era written communication was all done on a big scroll. Concertina binding is what took the scrolls place in the world of text and books (Allen. Et al, 2010). There were many advantages to this. The two main advantages were that it made it easier to print on these and for user experience when reading the texts, they would not have to unravel a full size scroll to get to a point of text they were looking for (Melcher, 2004). Concertina binding was primarily done by folding a long piece of paper in a zig zag fashion. Typically, the print would only be on the front side of the paper, giving it the feel of a book when the end of the zig zags were all combined (Melcher, 2004). All of the processes discussed so far in the chapter all laid out the foundation for print. They were all revolutionary for their given timeframe. Processes that made a path to the next big invention of printing.

The next revolutionary stage for printing was the moveable type printing. Again, this process was created in China (Gunaratne, 2001). The idea and process itself was created in the year 1041 by a Chinese man of the name Bi Sheng (Gunaratne, 2001). The first system that was made was the ceramic movable type. Every piece of movable type had one character of Chinese letters on it. The small blocks would have just been made up of glue and clay, and then would be heated to finally make the ceramic piece. Before being heated, the letter block would be engraved to allow the character to be

raised (Gunaratne, 2001). The size of the blocks with the characters on them would align with the grooves on a board. The boards were made to a size of the page they would be printing on with enough slots to allow these movable type pieces to be combined. They would then align the movable text pieces to create their desired text/page. After this they would have ink painted over the moveable type pieces before finally putting the paper on top. The paper is then brushed until the ink is visible through the paper displaying the text (Gunaratne, 2001). Wooden movable type was also created by Bi Sheng but was put aside as ceramic movable type produced better end results. The wooden movable type often left the result of the ink on the paper uneven and unclear (Gunaratne, 2001). Although that was the case then it was revisited by others that found ways to produce better results years later, wooden type was considerably more accessible than ceramic and went on to become the primary option (Gunaratne, 2001). Wooden movable type is still widely used in today in modern times. Many places in China are still practising the art as its tradition. Such as Wang Chaohui who is considered a master at producing wooden movable type pieces, usually he works predominantly with type but has started making artistic pieces for book illustrations. He believes that children in China should be taught this process at school, as he says it is a rich part of Chinese history and culture. When movable type systems were first created, they were not widely practised. There were many reasons why this was the case. The main fundamental reasons were that people were still using woodblock printing and even then, only a select few were doing that regularly. This was due to costing, most of the time they would only be producing one or two books at a time. Because of this it was always cheaper to hire somebody to hand write these books

rather than going through the printing process (Gunaratne, 2001). They would save a lot of money and time not having to pay for and set up the equipment. Another system of movable type was the metal movable type system which is notable but not groundbreaking as it did not surpass the wooden or ceramic in efficiency and availability, and therefore would not be further explored. As mentioned, the Chinese made movable type was used greatly in Asia it did not become westernised until Johannes Gutenberg invented the printing press also known as the Gutenberg press.

The Gutenberg press was another form of movable type. Inspired by Bi Sheng's movable type using a very similar process. Meaning it was not the first of its kind being a movable type process (Gunaratne, 2001). Even though it lacked in complete originality using a similar technique to the Chinese movable type, it was the best of its kind (Rees, 2005). Whereas the Chinese counterpart would use a singular board with slots for the movable type to fit within to then have ink applied and would use a brush to apply force to the paper to have ink applied to the paper. The Gutenberg press was more like a machine. The process included a press to apply force to the paper to add the ink (Rees, 2005). As mentioned, this was the first to become westernised. Before the Gutenberg press no movable type was practised outside of Asia. Sparking huge advancements in western countries in terms of print when it got invented. Prior to the Gutenberg press, in western countries books would be handmade, unlike China who at the time were already using their movable type system. The invention of the Gutenberg press made the biggest impact on the world to its counterparts. The chain of advancements not only to graphic design but the world was incredible (Rees, 2005). This was all due to how accessible the press made literacy information to the entire

world. At the time nobody had experienced the production rates of the press when it came to producing literature and informational pieces (Rees, 2005).

Arguably without the printing press history would not be the same. Information became accessible for everyone, books became cheaper as before the press books were much too expensive for the average household to own one, it was a luxury to have a book with the richest of the rich owning them as well as churches (Rees, 2005). With the accessibility of information that came with the press it helped with informing the people in regards of notable events, with some arguing the American and French revolution would not have even happened without the use of the Gutenberg press to spread masses of information. It is also claimed to be the most valuable creation of the millennium (Eisenstein, 2005).

The next stage of print going to be explored are the modernised options that are widely used in today's age. This system is digital printing which uses processes such as inkjet and solid ink printing. Digital printing is far beyond the likes of the printing press. The production rate alone makes it far more efficient. Technology as a whole has become more accessible so has printing. As mentioned earlier the printing press made books more accessible, digital printing made printing more accessible. There are a wide variety of digital printers available with a variety of purposes. There are printers made for the intent of printing daily office items that do not require professional standards, to the industry printers for commercial and educational use that meet accuracy across size and colour amongst what is being printed. The fact that there are printers available for such a low price means that they are affordable for anyone, with most households

owning at least one digital printer. Thus, making print an accessible piece of technology of the twenty first century.

Chapter 2

2.1 The Digital Era

In the last century the world completely changed due to the technology advancements.

With each new technology advancement leading to a chain of new discoveries. Not only people but the world is now reliant on computers (Carr, 2008). The world is constantly advancing towards a more automatic process, with computers, phones, applications, everything now is only a click of a button away. Although some argue that the more the world becomes automatic, the more damaging it becomes for the working world with human jobs being replaced by computers and machines (Morikawa, 2017). Especially considering these advancements have only come in the last few decades and people are already dependent on this technology.

The world of graphic design is no different and has drastically changed due to computers and the internet. The birth of the internet meant that the whole world was connected at all times. Some will argue that the internet alongside social media is ruining society (Siddiqui. Et al, 2016). For business and marketing there is no tool greater. This advancement in technology meant that anyone can advertise, sell or buy at any given time. It even gives students the ability to have access to an unlimited supply of resources with millions of articles, papers, books and websites all with a push of a button. Making almost every working process faster and more efficient (Grabe. Et

al, 2005). No more is that point clearer that the world and forever growing industry of graphic design.

The ability to connect with anyone around the world meant that graphic designers can work with anyone around the world. In return the designers work will be showcased and advertised in any given part of the world. It is also given graphic designers the ability to advertise themselves or their business through the online medium. No more is it necessary to have to send clients or employers physical printed copies of their work portfolio and can now display them on their personal websites for the world to see (Hanafizadeh, 2012). All these technological advancement stem from the birth of computers. The internet and marketing are not the only thing computers brought to the graphic design industry. It brought a whole new medium to design in and thus beginning a new era in graphic design as it progressed into the digital world.

Not only did the workspace of an average graphic designer change but with these technological advancements there came a whole new list of design jobs for graphic design (Duyne. Et al, 2002). With the birth of the internet came the beginning of web design also known as user interface and user experience design which are often seen under their abbreviation of UI and UX design. The graphic designers focus on these projects will be on the user interface, this is where all the graphic design elements go. The graphic designer can do the user experience work if they have proficient skill in coding to be able to meet the needs of the layout (Duyne. Et al, 2002). The beginning of the smartphone also added to this working field, both using the same design work just designing for a much smaller layout. To make it brief all these new appliances needed a graphic designer to create the digital visual aspect. This meant there needed to be a

new way of designing. Whereas before the age of computers and user interface design was primarily done hands on in the paper medium. Arguably graphic design is the industry that has benefited the most from the era of computers (Duyne. Et al, 2002).

2.2 Adobe

The graphic design process is forever evolving and for new designers is a much more accessible world and process and if not educated in the history of design then new designers will not know how tedious and demanding the process was before the era of design software (Pfiffner, 2002).

There are plenty of design software applications that graphic designers can use in this day and age, but typically most graphic designers use the Adobe suite. Adobe was founded in 1982 in California, United States of America. The founders both born in America are Charles Geschke and John Warnock (Pfiffner, 2002). In the early days of Adobe, the founders were selling their postscript language with one of their first customers being Apple who bought a licence to use their language to work with laser printers in 1985 (Pfiffner, 2002). This was the very beginning to a business relationship that still exists today. Because of Apples early investment into the company, the software applications creatives know, and love were developed to be used solely on the Macintosh systems. This was the beginning of the digital design world and desktop publishing (Pfiffner, 2002). The main Adobe software programmes that the graphic design industry heavily use are Illustrator, Photoshop, and InDesign. Each of these software applications were developed for specific design purposes (Pfiffner, 2002).

2.3 Adobe Illustrator

The methodology to designing a logo has always remained the same in terms of pre-production. A logo is the front cover of a brand and business, and while the saying goes 'don not judge a book by its cover' that is not the case, logos can determine the success of a brand identity. Graphic designers will establish the fundamentals of a company before sketching out ideas in ways of representing the brand in its best manner. Before the digital era, graphic designers sometimes worked similar to architects when designing marks and logos (Adams. Et al, 2006).

A draftsman table is used to create accurate drawings when they need to be precise. Therefore, engineers and architects alike have heavily used them for design jobs before the age of computer like software such as cad. The technique was to accurately position the paper to that it is level to the board using the boards straight which can then go up and down the board using the adjuster. This paired with a set of set squares and rulers and accurate drawing techniques were able to create scaled down measurements of projects that were true to scale. Due to the use of logos in the world these techniques were transferable and used throughout the graphic design industry as logos and marks would be scaled and downscaled where they would be featured. Due to working in the paper medium in the design stage this created problems in terms of time and productivity. Therefore, it was often when mistakes were made the work would have to be scrapped thus effecting cost and time waste as these projects were labour intensive. The task therefore became difficult and high pressured in comparison to how design is done today (Laura, 1950).

The first of graphic design-based software to be developed by Adobe is Illustrator. Development for Illustrator began in 1985 and was released two years later in 1987 by Adobe. In the early stages of Illustrator, it was exclusively developed to be used on Macintosh systems (Encyclopedia Britannica, 2019). Illustrator is a vector-based illustration programme. Most image or graphic files such as JPEG, PNG and GIF are made up of pixels to make their resolution. The problem with this system is that you are then limited to the scale you begin working with. In most cases this is fine, such as working with photographs or layouts for such designs for websites. The problem comes when working with such designs as logos and branding (Foley. Et al, 1994). Logos are typically the same mark and are used in a wide variety of sizes. A good example of when working with up-scaling and down scaling of logos are with sports team organisations where they will have a very large version of their logos for their stadiums as well as very small versions on merchandise. Although the outcome can be achieved by working with a large resolution to work with pixels, not only would you then need multiple files for each logo size but the files themselves become much larger when working with the bigger sizes (Foley. Et al, 1994). Illustrator does also have the ability to work with files such as JPEG, GIF and PNG but is primarily used for vector graphics, in the graphic design field.

A vector graphic unlike raster graphics composed of pixels with colour to create an image, whereas vectors are made up with paths which are used to create shapes with various lines and points. These points all have a specific position on the x and y axis, additionally it is worth mentioning that vectors are only used on a two-dimensional axis. When scaled up and down in size Illustrator uses a mathematical formula thus making

the vector graphic retain its shape across all sizes (Ferraiolo. Et al, 2000). Making vector graphic files a very efficient way of working not only with clients, but other creatives that may be working on other aspects of a project where the image would need to be resized. Thus, making it the most efficient way of working with logos.

2.4 Adobe Photoshop

Shortly after the development of Adobe Illustrator, Adobe began developing Adobe Photoshop in 1988. Adobe Photoshop was then further released in 1990 to the public and just like Illustrator on release was solely released to Apple Macintosh systems (Team, 2002). Adobe Photoshop is the most known software application from Adobe globally, and since its release has had a verb meaning to the word. Unlike Illustrator Adobe Photoshop works with rasterized graphics, meaning it works with pixels to make a resolution. Thus, meaning these exported raster graphics cannot be upscaled and downscaled without significant quality loss (Foley. Et al, 1994). This does not mean that vector files cannot be imported and upscaled in Photoshop, they can but once the file is exported to a JPEG for example then it becomes limited to the resolution.

Photoshop's primary and original use was for photo editing. Photoshop was introduced as the digital alternative to post photo editing. With the tools in the software's toolbar named after real hands on methods and equipment. These methods such as dodging and burning are both in the toolbar in Photoshop. Prior to Photoshop these would be done in a dark room to achieve the desired effect (Kirby. Et al, 1972). Burning and dodging is done by blocking the light on a print, but both are done differently. Burning is done by blocking the light and only allowing a desired window of light through on a certain point of an image. Whereas Dodging is done with a rectangular piece waved in front of the light to cover parts of the image, making the area that is covered is then

darker than the area that was under the light longer (Reinhard, 2002). This is one of many Photograph manipulation techniques that can now be done digitally since Photoshop.

Many problems arise when doing all the photograph editing techniques the manual way. Although many photographers such as Reinhard (2002) argue that the hands-on darkroom methodology produces greater outcomes, this comes with years of training and experimenting to perfect the craft. This very quickly becomes very expensive and from a graphic designer's standpoint would typically be outsourced to a darkroom professional thus impacting the cost even more.

With the learning curve being trial and error until perfection which could end up being hundreds of prints which is not cost effective, therefore a reasoning behind why Photoshop is the favoured option by many (Team, 2002). Having the ability to test tools in the software repeatedly with no fear of error as the option to reset for free is possible. The ability to have a quick reset is one of many reasons that Photoshop is the preferred option by many. Before Photoshop the process was very slow and in industry when working on projects physical copies would need to be sent which in turn made the process slower. The quick and immediate of Photoshop builds to a more efficient workflow (Team, 2002).

2.5 Adobe InDesign

InDesign was certainly not the first of its kind when Adobe released the software application back in 1999. In fact, InDesign was not the first of its kind to be developed by Adobe, but instead was the result of an earlier application named page maker which was purchased by Adobe by purchasing the Aldus Corporation in 1994. Adobe then

discontinued the software PageMaker to ensure there was a gap in the market for their software application entitled InDesign (Cohen. Et al, 2012).

The software application Adobe InDesign is a typesetting and desktop publishing programme by Adobe. This software had a tougher launch than its Adobe previous launcher as the market did not want to leave other desktop publishing applications they had been using, Adobe quickly acted on these and included it within a bundle with Photoshop and Illustrator. InDesign was also the first desktop publishing application to natively work on Macintosh. Arguably InDesign is a graphic designer's go to software depending on what sector of graphic design they are in (Cohen. Et al, 2012).

Desktop publishing has significant importance due to what it did for the field of design. Before desktop publishing was invented in the mid-1980s the world of publishing and printing was very expensive and inaccessible meaning that only meaning that only few companies and people had the power and resources to do so. This heavily relates back to chapter one in regard to print and typesetting methodology. Desktop publishing is the new era and is a much more accessible outlet to publishing and print. Desktop publishing is accessible to everyone and in many different forms of software applications. With that in mind many people argue that since it was accessible to everyone, in return many bad designs began to be made (Pfiffner, 2002). That may not have happened prior to the birth of desktop publishing as the only people and companies with access were typically highly trained graphic designers and printers. Therefore, although accessible to everyone globally there was still a need for a good graphic designer to be behind the screen with good understanding of type and publishing principles to have the ability to produce good designs. This is exactly why

graphic designers typically use InDesign, as it gives the ability to manipulate type to create and produce good design work with brilliant typography, with access to thousands of typefaces from a click of a button (Pfiffner, 2002).

Just as well as illustrator and photoshop InDesign offers the ability to bring in these files to work with. The benefit of this is if for example there was a problem with the image brought in from photoshop to the InDesign file. They can then go into the photoshop file to make necessary adjustments which will automatically apply to the InDesign file and this includes illustrator files as well (Padova. Et al, 2008). This benefit is an advantage to other software applications, but also to methods used prior to desktop publishing where in many cases the project would need to be remade which would increase time and cost to a project, all these factors contribute to the efficiency of working on a design based project in terms of cost, accessibility and time (Padova. Et al, 2008).

Conclusion

In conclusion throughout the research and points made in this independent inquiry there is a clear theme to what these advancements made to increase accessibility and efficiency, also both have similar answers in terms of what makes these advancements and methods efficient and accessible. The recurring points are cost, time consumption and skill level entry. As many things discussed in this independent inquiry the prior techniques and methodology usually were required training to be able to do thus not making them considerably accessible. this does not take away the fact that you still need to be trained with the latter versions to be able to produce good design.

From the beginning of print to the present techniques explored there is a clear and recurring theme to each new discovery. Although upon each discovery there may have been subsequent time frames in when they surpassed their prior in terms of efficiency and accessibility, they did with time when practised by many and revisited. Each advancement to the field of print introduced the next step of accessibility and efficiency. The points demonstrated was that with each discovery came a decrease in cost and increase in time productivity. Although some practises did not see the decrease in cost instantly. This is due to the demand and usage of the printing when made, this was demonstrated with the invention of movable type and the lack of need for mass production at the time. Due to the lack of need of mass production it was not more cost effective and therefore people didn't adopt this technique widely as it was cheaper to practise other methods. The research clearly shows that onwards of movable type the new processes that were developed did indeed increase the efficiency and accessibility.

In regard to the digital and software chapter again there is clear attempts to demonstrate points of which the design industry is more accessible and efficient. Time, cost and training did reoccur throughout this chapter of the independent inquiry. Mostly in terms of training in regard to accessibility throughout the chapter but cost did play a part in the desktop publishing sequence. As before desktop publishing it was all down to having the equipment to typesetting and printing which required expensive equipment. The same can be said about digital and darkroom photo editing. In terms of logo design using illustrator and its prior with drawing techniques training played the main role in accessibility here as there would need to be some substantial draftsman and drawing skill. Efficiency throughout this section of the independent enquiry was down to the ability to

work with others at faster rates, access to files and ability to work on multiple files in one project. Also, the ability to rectify mistakes without completely starting again on a project demonstrates the efficiency of software applications in the graphic design field. Although Ted Forbes argued that in some cases it does not create better outcomes of work, that comes down to a matter of his opinion and love for the manual hands on craft.

Bibliography

Adams, S., Morioka, N. and Stone, T.L., 2006. *Logo design workbook: A hands-on guide to creating logos*. Rockport Publishers.

Allen, S.M., Zuzao, L., Xiaolan, C. and Bos, J. eds., 2010. The history and cultural heritage of Chinese calligraphy, printing and library work (Vol. 141). Walter de Gruyter.

Carr, N., 2008. Is Google making us stupid?. *Yearbook of the National Society for the Study of Education*, 107(2), pp.89-94.

Cohen, S. and Burns, D., 2012. *Digital Publishing with Adobe InDesign CS6*. Adobe Press.

Cooper, J.S., 1996. *Sumerian and Akkadian*. The world's writing systems

Diringer, D., 2013. *The book before printing: ancient, medieval and oriental*. Courier Corporation.

Duyne, D.K.V., Landay, J. and Hong, J.I., 2002. *The design of sites: patterns, principles, and processes for crafting a customer-centered Web experience*. Addison-Wesley Longman Publishing Co., Inc..

Eisenstein, E.L. and Elizabeth Lewisohn, E., 2005. *The printing revolution in early modern Europe*. Cambridge University Press.

Encyclopedia Britannica. (2019). *Adobe Illustrator | software*. [online] Available at: <https://www.britannica.com/technology/Adobe-Illustrator> [Accessed 4 Dec. 2019].

Ferraiolo, J., Jun, F. and Jackson, D., 2000. *Scalable vector graphics (SVG) 1.0 specification*. Bloomington: iuniverse.

Foley, J.D., Van Dam, A., Feiner, S.K., Hughes, J.F. and Phillips, R.L., 1994. *Introduction to computer graphics* (Vol. 55). Reading: Addison-Wesley.

Grabe, M. and Christopherson, K., 2005. Evaluating the advantages and disadvantages of providing lecture notes: The role of internet technology as a delivery system and research tool. *The Internet and higher education*, 8(4), pp.291-298.

Gunaratne, S.A., 2001. Paper, printing and the printing press: A horizontally integrative macrohistory analysis. *Gazette (Leiden, Netherlands)*, 63(6), pp.459-479.

Hanafizadeh, P. ed., 2012. *Online Advertising and Promotion: Modern Technologies for Marketing: Modern Technologies for Marketing*. IGI Global.

Heller, S. and Fernandes, T., 2010. *Becoming a graphic designer: a guide to careers in design*. John Wiley & Sons.

Kirby, H.D., Nearhoof, G.L. and Culler, J.G., Kms Industries Inc, 1972. *Exposure calculator and filter device for darkroom color photography*. U.S. Patent 3,685,900.

Laura, M., Ernie A Mckinney, 1950. *Tracing table*. U.S. Patent 2,510,124.

Meggs, P.B. and Purvis, A.W., 2016. *Meggs' history of graphic design*. John Wiley & Sons.

Melcher, C.H., Melcher Media Inc, 2004. *Book and method for making a book*. U.S. Patent 6,773,034.

Morikawa, M., 2017. Who are afraid of losing their jobs to artificial intelligence and robots? Evidence from a survey.

Padova, T. and Murdock, K.L., 2008. *Adobe Creative Suite 3 Bible* (Vol. 532). John Wiley & Sons.

Pfiffner, P., 2002. *Inside the publishing revolution: The Adobe story*. Adobe Press.

Rees, F., 2005. *Johannes Gutenberg: Inventor of the printing press*. Capstone.

Reinhard, E., 2002. Parameter estimation for photographic tone reproduction. *Journal of graphics tools*, 7(1), pp.45-51.

Siddiqui, S. and Singh, T., 2016. Social media its impact with positive and negative aspects. *International Journal of Computer Applications Technology and Research*, 5(2), pp.71-75.

Sungum, J.T., 1924. *Symbolism in the Sumerian written language*. Psychoanalytic Review

Team, A.C., 2002. *Adobe Photoshop 7.0 classroom in a book*. Adobe Press.

Triggs, T., 2011. *Graphic design history: Past, present, and future*. Design Issues, 27(1), pp.3-6.

Valladas, H., Clottes, J., Geneste, J.M., Garcia, M.A., Arnold, M., Cachier, H. and

Tisnérat-Laborde, N., 2001. *Palaeolithic paintings: evolution of prehistoric cave art*. *Nature*