Introducing Digital Visual Design To The Undergraduate Students Of Computing

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ARTICLE INFO	ABSTRACT
	Purpose | After a detailed review of the literature, and a couple of primary studies for his Doctorate of Philosophy in Design on "The Need and Model for Training in Visual Design for the UG Students of Computer Science", the author continued his action research, proposing, securing approval, and delivering a 20 credit full semester course in Digital Visual Design to the Undergraduate students of BSc (Hons) Creative Computing in their 1st Semester. The paper presents the major themes of the content delivered under a fresh course in visual design for the students of computing, delivered twice already since 2022.
	Methodology | Working with the key theories and practices in graphic design, design pedagogy, and the principles of human-computer interaction, the author drafts and introduces visual design to the students of computing, while tweaking the content keeping it highly relevant to the field of computing.
	Findings | The paper highlights, based on students' feedback, that once exposed to the connection, relevance, and application of visual design in digital artefacts, students immediately recognise its role and value, followed by good engagement in the course. Also, students of Semester 2 continue to report very good understanding and practice in visual design, designing and developing highly effective and attractive web applications.
	Novelty | The paper offers a unique approach to introducing visual design fundamentals to the students of computing from a "computing" perspective, with explicit examples that demonstrate the common and effective use of different elements and principles of design.
	Implications | The paper aspires to inform and support anyone offering training in visual design to students of computing.
	Keywords: computing, visual design, interdisciplinary training, undergraduate students

Introduction

"Visual communication of any kind, whether persuasive or informative …should be seen as the embodiment of form and function: the integration of the beautiful and the useful."

Paul Rand

Digital technology today, as software, websites, and web/smartphone apps, has become inseparable from our existence, helping us complete activities ranging from the very ordinary to the highly imaginative and ambitious, as we navigate through an infinite number of digital screens daily for our official tasks, entertainment, creative projects, and social interactions. Digital screens are important, as they are the gateway to the success of all digital solutions, and are the knowledge, skills, talent, and experience to draft and craft highly usable and visually appealing ones. However, the author argues that the future creators of these digital solutions, present students of commuting, are not even introduced to this critical aspect of digital technology, largely leaving them dependent on "self-help", templates, or experienced interface designers. The author argues that it is essential for every student of computing to be substantially introduced to visual design with a full semester course, supporting them in drafting and crafting visually appealing, and highly usable digital

interfaces, adding skills and projects to their portfolio, and offering opportunities to explore and develop alternate career in the industry.

A semester-long course in Digital Visual Design was proposed, and secured approval for the Year 1 students of Bachelor of Science in Creative Computing in their very first semester, starting September 2022. Although the course was informed by the curricula in graphic design, it was highly customized to digital screens to support the students of computing to easily relate to, and make sense of its real applications. The courtside has since been delivered twice and was very well received by the students, who continue to report how the course has trained them to view and analyse digital screens from a "designer's perspective", greatly helping them to conceptualize, draft, and develop contemporary, visually appealing, and high effective digital interfaces.

The paper presents an overview of the course, highlighting the content themes covered through lectures, discussions, case studies, and class activities, and is a part of the author's action research for his PhD Thesis in Design, titled, The Need and Model of Training in Visual Design for the UG Students of Computer Science.

Literature Review

While arguing for a full course in Visual Design for students of Computing, this section reviews some of the key research literature on the role and value of aesthetic digital interfaces in the overall usability of the system, the absence of even basic training in Visual Design in Compting curriculum, curriculum guidance for courses in Visual Design, and the recommended teaching methods deployed for same.

Digital Aesthetics and Usability

Marcus Vitruvius Pollio, an architect and author from ancient Rome, highlighted the significance of beauty (venustas) as one of the fundamental qualities of architectural design, along with strength (firmitas) and utility (utilitas) (Kruft, 1994). However, in the early stages of research and development in Human-Computer Interaction (HCI), the main emphasis was mostly on the operational factors, such as functionality, usability, and system stability. In 2018, the International Organization for Standardization (ISO) defined usability as "...the extent to which a product can be used by specified users to achieve specific goals with effectiveness, efficiency, and satisfaction in a specified context of use...". Tractinsky and Hassenzahl (2005) have argued that the original HCI approach focused on the first two Vitruvian principles of strength (firmitas) and utility (utilitas) only, while completely ignoring the third principle of beauty (venustas), which concerns the aesthetic appearance of the system.

As early as 1985, Gait argued that skillfully designed and visually appealing interfaces can improve user interest and the overall effectiveness of a system. Alben (1996) emphasised the significance of high-quality visual aesthetics in achieving effective HCI and enhancing the overall user experience. Similarly, Gelernter (1998) highlighted the utmost significance of beauty in the field of computing, stating that consumers continually give priority to aesthetics. Anders (1999) emphasised the importance of presenting content in a well-organised, visually appealing, and preferably innovative way, stating that aesthetics enhance the content.

According to Shenkman (2000), beauty is a key factor influencing visitors' initial perceptions of websites. Norman (2002) advocates the "aesthetic-usability effect" theory, which states that visually appealing items provide positive initial impressions and encourage continued user interaction. In his widely accepted and popular model published in 2002, Garrett presents a detailed framework called The Five Planes, which outlines several aspects of a complete and interconnected user experience, with Visual Design at the top. Dieter Rams' renowned Ten Principles of Design strongly emphasises the idea that "Good design is Aesthetic", while also advocating for innovation and usefulness. Likewise, Apple prioritises "aesthetic integrity" as a key aspect of its design principles for iOS. Lingaard et al. (2006) stress the significant influence of "visual appeal" on the first impression of a website and emphasise that lasting impressions are made within a brief 50 milliseconds of exposure.

Absence of Training in Visual Design

Despite the extensive research supporting the importance of good aesthetics and visual design in academia (Robert, 1995; Jerry, 1997), there is a noticeable lack of emphasis on visual design training for students of computing, the future professionals in the field. This is a matter of concern due to the rising need for computer science skills and the growing importance of visual communication in the use of technology, as emphasised by Hagerty (1995). Carter (2003) emphasised the need for CS students to have the ability to create effective visual interfaces, as technology progresses towards more visual and interactive interfaces. Finnegan and Griffin (2000) criticised the CS curricula for not adequately addressing visual design principles, especially considering the significant changes brought about by the web in how users interact with information systems, highly recommending an extensive curriculum spanning one or two semesters to sufficiently equip programmers for the growing visual challenges of the industry. Undergraduate CS programs have made significant advancements in integrating emerging technology and human-centred design approaches, including machine learning, artificial intelligence, and user experience design. Nevertheless, most curricula fail to adequately incorporate aesthetics and visual design, despite the extensive research and evidence of their importance in the development of digital products. As the field of computing education progresses, it is crucial to acknowledge the significance of aesthetics and visual design in developing captivating and efficient UX with all digital products.

A recent examination of 82 undergraduate CS curricula undertaken by Kapros (2018) shows that a mere 18% of the programs in his study included essential modules in HCI, 51% offered HCI modules as optional courses, and almost 29% did not provide even basic training in HCI. MacDonald & Sosebee (2018) emphasise the importance of this requirement in their analysis of specialised undergraduate programs in HCI/UX at 24 universities in North America. Although there is plenty of evidence showing the important influence of visual design on user experiences with digital objects, there is a lack of research focusing on incorporating it into current HCI or UX curricula. Khan (2022) emphasises the importance of including both functional and visually appealing screen layouts in the digital design process, with training in visual design education for students of Computing. He argues that this concept is not new or implausible, as the significance of visual design has been thoroughly acknowledged by notable individuals such as Marcus Vitruvius, Dieter Ram, and Don Norman; and that many experts have studied the relationship between aesthetics and functionality and have found empirical evidence that supports the good effects of well-designed interfaces in numerous aspects of users' interaction with digital artefacts. While the ACM/IEEE Computer Science Curricula 2013 revised its guidelines to suggest four Tier-2 hours of instruction in "designing interactions", which includes the subject of Visual Design; Khan (2022) found a strong demand for visual design training in primary research, with more than 86% of both CS teachers and students expressing suggestion or expectation for this training within the program. While technical proficiency was recognized as just "half of the difficulty" by several tutors, the students indicated a sense of being "ill-equipped" to face the demands of the industry due to a lack of proper training in visual design, hence emphasising the significance of acquiring this particular skill set. In addition, Khan (2022) also found that 44% of UG CS programs at 25 international universities in the United Arab Emirates (UAE) did not include any courses in Experience Design (UX) or Interaction Design (IX). Also, as expected, none of the programs included any course or subject matter that even addressed Visual Design.

Visual Design

Visual Design is defined as the deliberate application of visual components or assets such as images, text, and shapes; and methods to enhance their presentation, attractiveness, and messaging, as explained by Zettl (1973). Klett (2002) explains that visualisation entails graphically portraying data, objects, and systems to enhance communication and understanding. Interaction Design.org defines visual design as a deliberate undertaking that involves the incorporation of visuals, graphics, typography, and design concepts such as hierarchy and layout. Visual design involves the careful selection and arrangement of information and visual elements to optimise both functionality and visual attractiveness. It is crucial in promoting effective interaction and providing outstanding experiences. Zettl (1973) makes a clear distinction between Classical Aesthetics and Visual Design, emphasising the utilitarian aspect that is inherent in the latter, as the primary objective of visual design is to improve the functionality and usability of the product for a successful and pleasant User Experience (UX) by creating interfaces that are easy to use, as well as visually appealing.

According to interactiondesign.org, both Graphic Design and Visual Design follow similar curricula including the Elements & Principles of Design, comprehension of Color Theory, Typography, and Layout to create engaging and influential designs. While Graphic Designers focus on conveying messages through visual elements like logos and marketing, Visual Designers concentrate on improving user experiences, through effective designs of the digital interfaces of websites and applications. Visual Designers combine graphic elements to provide a consistent user experience across all platforms, utilising a wide range of skills, including proficiency and a thorough comprehension of user experience and interface design.

The Course in Digital Visual Design

Based on primary research (2022), the author argued that the existing (limited) courses in User Experience Design or Human-Computer Interaction are heavily (and rightly so) inclined towards the "technical" and "heuristic" aspects of digital screens, addressing topics such as User-Centred Design, Principles of Interaction Design, Usability Laws, Principles, and Guidelines, and Usability Testing. For example, the course description for Human Computer Interaction under the Bachelor of Information Technology at the Higher College of Technology reads, "Topics include user-centred design, human cognitive principles and models, and multi-modal aspects of HCI. Throughout the course, a series of progressive assignments help students gain hands-on experience in evaluating interfaces using usability testing, dialogue methods, reaction time and display rates, information presentation, and creating sketches (LoFi) and high-fidelity interactive prototypes (HiFi) for selected business scenarios.", with no reference to Principles of Visual Design!

With several years of experience working with students of Computing, observing the "low visual quality and appeal" of their digital outcomes, and highly driven by the literature review plus his primary research, the author proposed a full Semester 20 Credits Course in Digital Visual Design for the 1st-semester students of BSc (Hons) Creative Computing program, in addition to another full semester course in Experience Design in 2nd-semester, at his British university partner campus at Ras Al Khaimah, United Arab Emirates in 2021. It is argued that it will take a full semester course to just acknowledge and adequately practice even the basics of visual design. A formal rationale and argument were filed, followed by detailed discussions on the prospects and outcomes of the new course. The proposal was strongly supported by the Link Tutor at the UK Campus, who diligently followed the proposal, and secured the Board of Academics' approval in early 2022, with the

course to have its first run in September 2022. The author confidently argues that since the existing courses in HCI have extensive topics in their own right to cover, students of computing must have a full semester dedicated course in visual design to adequate acknowledgement, and substantial practice in putting a variety of digital assets such as text, shapes, images, and videos together on a digital screen in both visually appealing as well as highly usable manner.

In addition to dedicated topics in visual design, informed by existing and extensive curricula in graphic design, the author takes a "topic in action" approach when introducing concepts such as topics such as Elements of Design, and Principles of Design, with examples strictly limited to live websites. The author recommends this for three reasons:

1. Students of computing must be reinforced on the importance, and need of the course, which can be effectively achieved only with the projected applications in action.
2. Students will find creative, but static graphic design artworks, where the focus is communication and message, as "out of context".
3. Examples of high-quality website designs will explicitly demonstrate and reinforce the applications of these Elements and Principles in developing digital artefacts they have enrolled for.
4. The examples will highlight the role and importance of Visual Design in the design, usability, and aesthetics of highly effective and modern digital interfaces.

The following are the highlights of the content covered in classes over the semester, delivered with extensive additional lectures and examples.

### Evolution of Web Design: A Visual Journey
The course jump-starts with a journey down memory lane of the history of the website's design, with online repositories such as web.archive.org/ & webdesignmuseum.org/. The website archives snapshots of a large number of websites and is incredibly useful to study how they looked in history and compare how website design has evolved over the years.

Students are encouraged to look back, observe, acknowledge, and identify the evolution of websites' visual design over the past decades, to ensure their own designs never look like coming from the 1990's, but rather up to date with the latest patterns and trends.

They are introduced to https://www.awwwards.com/websites/ and https://www.siteinspire.com/ to browse through some of the best, and award-winning web designs on the internet, to develop an eye for current trends, and take inspiration for their developments from here on.

Google (1997)
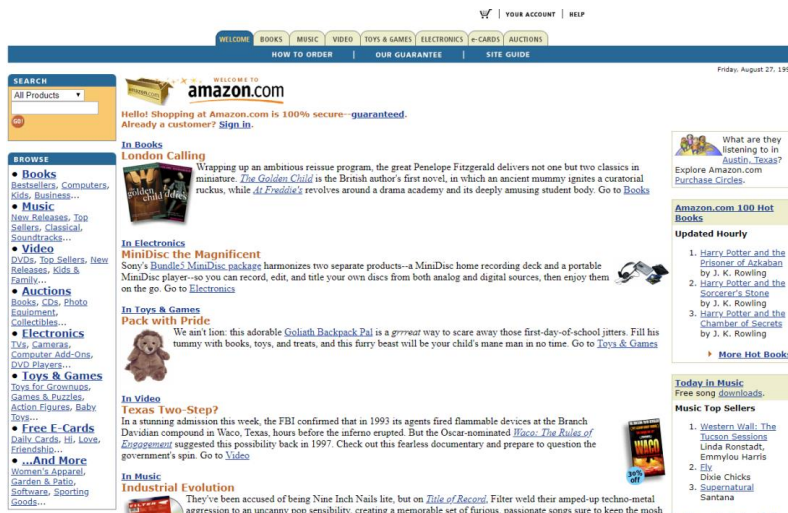
Amazon (1999)

Facebook (2004)

## The Vitruvian Principles: A Demonstration

3 slides with identical content.
The 1st slide is technically perfect (hosted on the cloud) but is neither usable (hardly readable), nor aesthetically appealing.
The 2nd slide has identical content, but in different colours with better contrast; and is technically perfect, now much more usable (easily readable), but still not aesthetically appealing.
The 3rd slide again has identical content, but a different treatment in composition with better typeface, hierarchy, alignment, contrast, and graphic elements. It is now technically perfect, as well as both highly usable and aesthetically appealing.
Students are demonstrated how while all digital artefacts must "run" technically perfectly, with training in visual design, they can be made highly usable and aesthetically appealing.
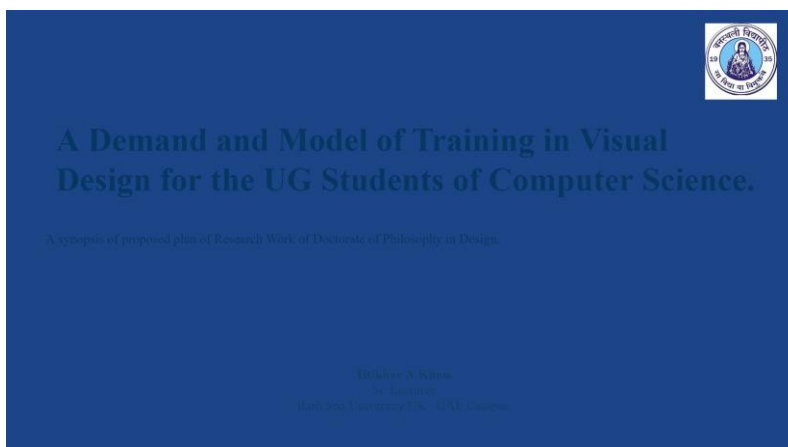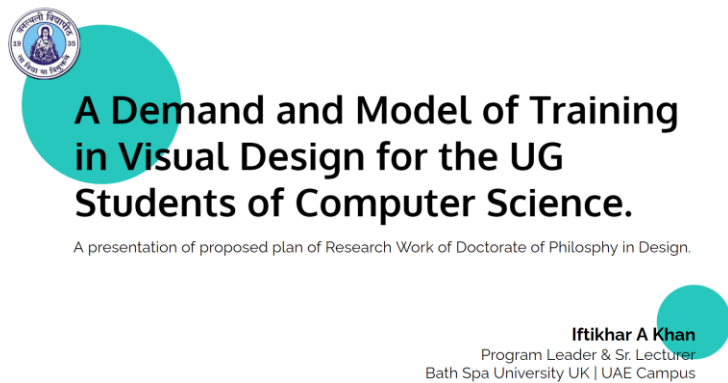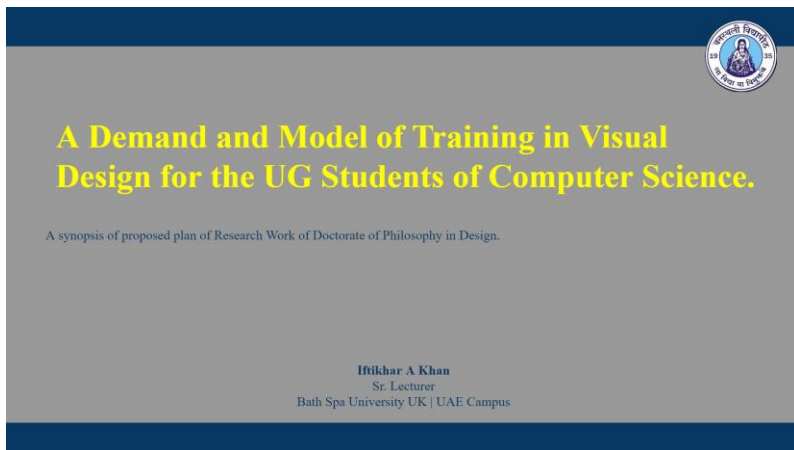
The Digital Screens: Worst First

On one hand, students were introduced to https://www.awwwards.com/websites/ to recognise good design, and now they are showcased some of the worst website designs on the internet.

Importantly, these websites are not only badly designed, but appear highly confusing and unusable as well.

This encounter with inadequately designed websites provides a valuable lesson, emphasizing the crucial connection between visual design and usability in digital objects.

The exposure and discussion of these websites as "bad designs" informs students to avoid such compositions at all costs!

https://www.arngren.net

https://www.apple.com/ae/


https://www.apple.com/ae/
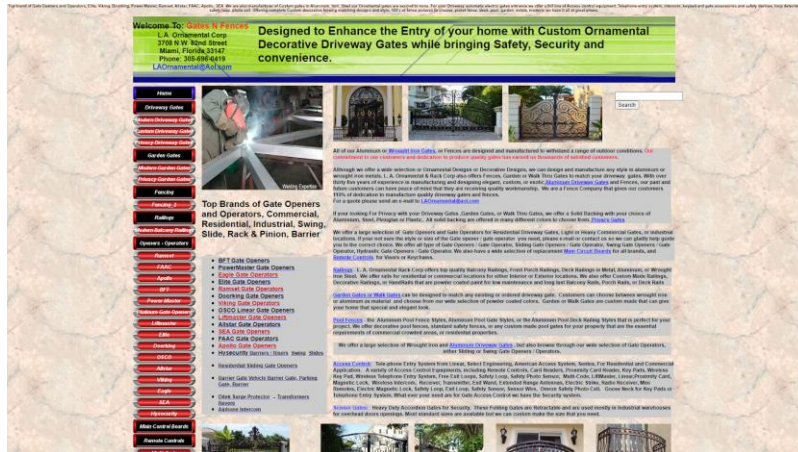
The Digital Screens: A Design Dissection

A common digital screen, such as Google Meet, displays how every "user" sees and interacts with at his end.
Using www.figma.com, the screen was traced and highlighted with the basic graphic elements on the screen such as dots, lines, circles, and rectangles in red colour. These elements were finally displayed in isolation.
Students are shown how all basic to complex digital screens are a composition of a large number of graphic assets such as dots, lines, shapes, text, imagery, and icons.
This has been a "eureka" moment in the class, where students can suddenly "see through" the digital screens as a group of graphic elements. This informs and inspires them to view digital screens from a "maker's" perspective, acknowledging the skill, and hard work required to draft and design digital interfaces.
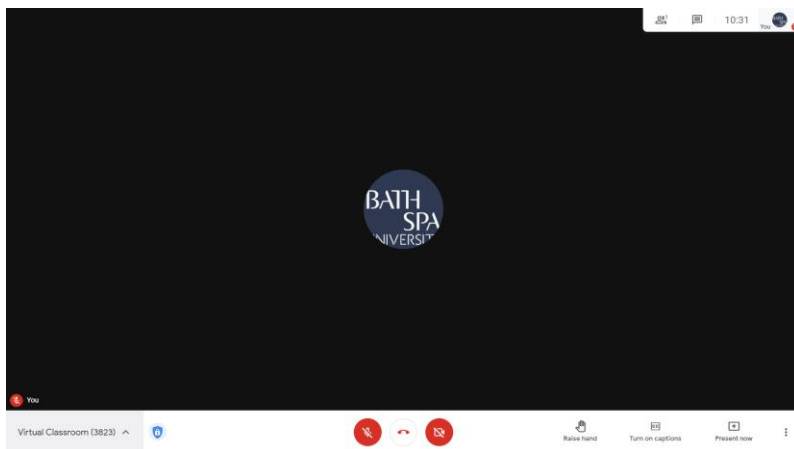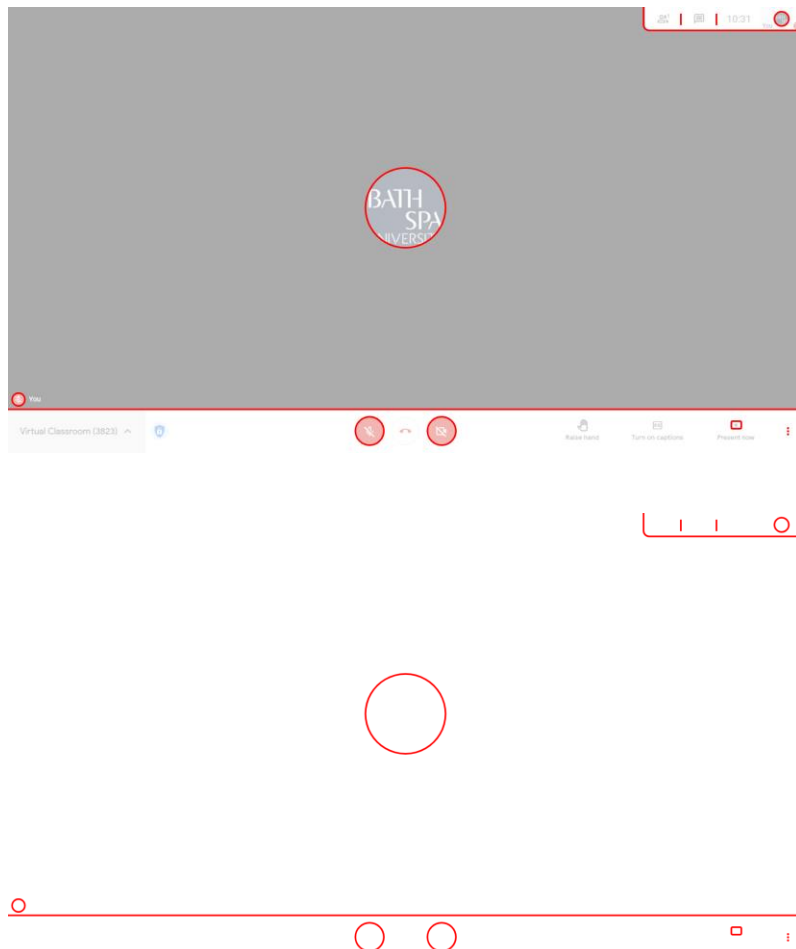
Scientific Research and Literature: Key Readings

Students are introduced and encouraged to read some of the key literature, and books in the field of Digital Visual Design to familiarise themselves with the scientific approach, research, and evidence in support of good visual design on a large number of User Experience factors such as usability, first impression, understanding, credibility, and likeability with the digital artefacts.

Don Norman

The Design of Everyday Things, 1998; Emotion & Design: Attractive Things Work Better, 2002; Emotional Design: Why We Love or Hate Everyday Things, 2004

Noam Tractinsky

What is Beautiful is Usable, 2000; Toward the Study of Aesthetics in Information Technology, 2004; A Few Notes on the Study of Beauty in HCI, 2004; Does Aesthetics Matter in Human-Computer Interaction?, 2005; Arguing for Aesthetics in Human-Computer Interaction, 2005; Visual Aesthetics in Human-Computer Interaction: Justification and Findings, 2011; Visual Aesthetics, 2013

Marc Hassenzahl

The Study of Visual Aesthetics in Human-Computer Interaction, 2008; The Inference of Perceived Usability from Beauty, 2010

Gitte Lindgaard

User Satisfaction, Aesthetics and Usability: Beyond Reductionism, 2002; Attention Web Designers: You have 50 milliseconds to make a good first impression!, 2006; Aesthetics, Visual Appeal, Usability, and User Satisfaction, 2007; An Exploration of Relations between Visual Appeal, Trustworthiness and Perceived Usability of Homepages, 2011

Books
● **Visual Usability**
Tania Schlatter and Deborah Levinson, 2013

● **Designing Interfaces: Patterns for Effective Interaction Design**
Jenifer Tidwell, Charles Brewer, Aynne Valencia, 2020

● **The Elements of User Experience**
Jesse James Gerret, 2002

● **The Principles of Beautiful Web Design**
Jason Beaird, James George, Alex Walker, 2020

● **Graphic Design, Learn It, Do It**
Katherine A. Hughes, 2019

Elements of Visual Design: Dots
Dots are the most basic element of visual design, and also the smallest. While it has infinite possibilities in art and graphic design applications, it is associated with certain patterns of usage in digital interface design. A popular usage is to indicate the count of screens under the horizontal or vertical scrollers on websites, as well as splash screens on smartphone apps. A similar style is also used to indicate the count of sections in a single-page web page. Another usage is as "ellipsis". The ellipsis, denoted by three dots (...), is used to indicate supplementary choices or actions. For example, in a menu, it indicates the existence of other items that are not currently shown.

Elements of Visual Design: Lines
In their study, Gatto, Porter, and Selleck (2011) classify lines into six distinct categories: structural line, outline, contour line, gesture line (also known as movement line), sketch line, and implied line. An outline refers specifically to the lines that define the edges of an object, whereas contour lines are used to clearly define the forms of objects. Vertical lines commonly elicit feelings of elevation, steadiness, and nobility, whereas horizontal lines tend to inspire a sense of serenity, peacefulness, and equilibrium. Additionally, diagonal lines add a sense of energy and excitement to a design, while curved lines elicit emotions and create a feeling of smooth and effortless motion.

Elements of Visual Design: Shapes
A form is a two-dimensional entity composed of lines, which can be broadly classified into two categories: geometric and organic (Gatto, Porter, & Selleck, 2011). This is a critical topic, as students were already shown the "design dissection" of webpages, and now reinforced that all websites have a wireframe or container boxes underneath, that are nothing but simple shapes such as squares, rectangles, and circles. Students are encouraged to see through and visualize webpages as a composition of basic shapes, making it easier to draft new ones.

Elements of Visual Design: Colours
Colour is crucial in visual design as it dictates the overall ambience of a design. For example, the colour red elicits emotions of intense desire, orange emits a sense of vitality, yellow symbolises luminosity, and green communicates a sense of rejuvenation (Lohr, 2008). However, it is crucial to acknowledge that the understanding of colours varies throughout other civilizations (Ware, 2008). Colour fulfils multiple functions in design, such as capturing attention, organising elements, communicating significance, and improving visual appeal. When used effectively, colour may enhance designs, making them visually appealing and highlighting the organisation and importance of pieces within. Students are introduced to colour palette tools like https://coolors.co/, and https://colorhunt.co/.

Elements of Visual Design: Typography
Typography is the organization of letters, words, and text in various situations, making it an essential part of visual communication. Proficiently mastering this ability is crucial for designers to effectively communicate. Visual Designers explore the complexities of typography, and use their creativity and imagination while following its laws and traditions, to create visually captivating and communicative designs. Students are introduced to several font tools such as https://fontjoy.com/, https://www.fontpair.co/, and https://www.fontshare.com/pairs, and encouraged to use them for effective and appealing combinations.

Elements of Visual Design: Imagery
The timeless adage that "a picture is worth a thousand words" continues to hold in the context of the internet. Images and illustrations serve as visual stimuli, attracting casual visitors and engaging them with your information. Images are crucial in influencing the atmosphere of a design. Especially in digital platforms such as websites and mobile applications, images are a powerful tool for expressing a brand's identity. Carefully selected images possess the ability to convey a captivating narrative with a mere glance, surpassing the communication potency of words. Furthermore, images have a wonderful capacity to elicit significant emotional reactions, rendering them essential tools in design undertakings. However, the text has to be

carefully placed against a background image to ensure no part of it merges with the background, and that all of it is easily readable.

Principles of Visual Design: Contrast
The notion of contrast, commonly known as the focal point, involves intentionally placing opposing elements in a composition to guide viewers' attention towards specific places (Lauer & Pentak, 2012; Williams, 2008). Comparing a certain constituent to others facilitates its identification (Ware, 2008). Contrast has a role in the formation of mood (Gatto, Porter, & Selleck, 2011). The objective is to create a visual hierarchy that matches the importance and goals of each content part. Contrast pertains to the disparity between the areas of highest brightness and lowest darkness inside a picture or text. Sharp and well-defined contrast is crucial in properly separating elements from one another, strongly affecting the degree to which that element will be visually prominent.

Principles of Visual Design: Hierarchy
Visual hierarchy is an essential principle of design in all forms of media. The principle states that the most important information should receive the highest level of focus, while less significant pieces should fade into the background. An efficient visual hierarchy allows visitors to rapidly comprehend the organisational structure of a design. It offers instant indications about the relative significance of screen components, and their interconnections, and directs users on further actions to be taken.

Principles of Visual Design: Balance
Balance refers to the way visual elements are distributed (Lohr, 2008). Balance in design involves achieving a harmonic arrangement of different features, such as horizontals, verticals, dark areas, and light areas. Humans have an inherent sense of equilibrium, which impacts their perception of visual arrangements. Informational materials should demonstrate a skilful balance, achieving a delicate equilibrium that captures attention without producing disruption or distraction.

Principles of Visual Design: Alignment
Alignment in design refers to the process of organising pieces in a composition to create a feeling of equilibrium, organisation, and lucidity (Lauer & Pentak, 2012). Proficient utilisation of alignment improves the organisation and guarantees consistency in design. Grid systems are frequently used to create alignment by using intersecting vertical and horizontal lines to organise layouts and guide the positioning of pieces. Designers can achieve systematic organisation of content, ensure consistency among designs, and have the advantage of flexibility in generating various layouts by adopting grids. Alignment promotes a feeling of balance and consistency, improving the overall visual appeal and perceived stability of the design.

Principles of Visual Design: White Space
Whitespace, commonly referred to as negative space in graphic design, refers to the empty regions on a page that do not include any graphic asset. Whitespace functions as a means to create visual space, guiding the user's attention across the page. Moreover, it plays a role in fostering equilibrium and cohesion in the design. Another aspect of adequate white space is avoiding clutter, and information overload on a screen at a time. Leaving adequate space between and around different elements on the screen supports a peaceful, pleasant, and focused experience for the users.

Principles of Visual Design: Gestalt Psychology
"Gestalt" is German for "unified whole". The Gestalt Principles are a set of basic principles that explain how humans see objects by grouping related pieces, recognizing patterns, and simplifying complex visuals. Designers utilize these concepts to organize content across websites and other interfaces, to achieve both visual attractiveness and ease of understanding.

Important Gestalt principles are Emergence, Closure, Common Region, Continuity, Proximity, Similarity, Symmetry and Order, and Common Fate. Gestalt is critical for web pages as it informs the placement of elements on the screen based on their differences, similarities, or importance.

Discussion

Computing students enrol in computing programs to learn "computing" only, as they come "familiar and ready" to learn programming languages like Java, Python, or HTML, tools such as Visual Studio Code, and Android Studio, and concepts such as Machine Learning, and Data Mining. Lots of students in the past two years reported the introduction to Digital Visual Design was an "eye-opener", where for the first time, they saw a webpage from a "maker's perspective", with a large number of digital assets composed together by the web designer for a usable, effective and appealing artefact.

Besides regular lectures, class projects, and final assessments, students were also asked to regularly reflect on the ongoing topics and activities. The following are only a handful of excerpts from students' commentary, reflecting a strong, and common theme.

"A lecture that caught my attention are the 3 core principles of Vitruvius. These are Firmitas, Utilitas, and Venustas. These caught my attention because they have been valued for centuries because they capture the idea of making things that are strong, useful and beautiful, which is something everyone can appreciate."

"One of the lecture contents that caught my attention, as of now, was the composition of using shapes as a base to start off a layout for structuring a website, wherein it all builds from the ground from simplicity to complexity. This has never left my mind ever since the day it was taught and has become a core memory due to how effortless but significant it was."

"One of the things that were said in a lecture made me realize that, when you use your phone, laptops, etc., it is essential to know that everything you see is just a screen, and as a Computing student, you must know what makes up that screen, hence, we learn Digital Visual Design to enhance our capabilities of figuring out what these elements are and potentially use them for our own work."

"In one of the classes, we touched upon the screenshots of different websites and applications. It quite fascinated me because I never really thought about it until then. I didn't know Netflix had been around for so long, back from the time where screens were squares. The change is, of course, big. Now I become more aware and a bit more meticulous about the things I'm seeing--like that one time my friend, my twin, and I talked about Papa John's tissue design when we ate there, or all the times I scroll through an app or click on a website."

The training had a noticeable impact on students' understanding and method of examining digital screens, as evidenced in the above feedback obtained from students. The course exposed, introduced, and encouraged a fresh viewpoint, motivating students to explore the complexities of creating digital interfaces in depth. The significance of this newly acquired comprehension was especially remarkable in the context of web development, as demonstrated by the feedback received from students who went on to pursue a course in Web Development in the following semester, reporting an evident enhancement in their understanding of layout and design principles, crediting it directly to the groundwork established in the introductory course.

Furthermore, the author witnessed a noticeable improvement in the quality of website designs created by the students. The enhancement was evident in the meticulous attention given to the arrangement, the deliberate utilization of visual components, and the overall consistency and efficacy of the designs. The statement emphasizes the significant and positive effect of the course in providing students with the abilities and understanding required to develop engaging and easy-to-use digital experiences.

In conclusion, the author is highly content and confident with the introduction of this new course, its content, class activities, commentary, and final assessment, and strongly supports the integration of a comprehensive semester-long course in Digital Visual Design for all students pursuing degrees in Computing majors. This course provides important interdisciplinary instruction, equipping students with the crucial expertise and understanding necessary for their achievement in the swiftly changing information technology sector. By incorporating visual design ideas into their curriculum, students become more equipped to take advantage of the numerous opportunities in industries such as web development, graphic design, user experience design, and digital marketing. This comprehensive approach not only improves their technical skills but also cultivates creativity, critical thinking, and problem-solving skills which are crucial for success in today's digital world. An introductory course in Digital Visual Design in the curriculum will guarantee that computing students acquire a comprehensive education that equips them with the necessary skills for the contemporary, and future job market.

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